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THE

Joiner's Own Book,

AND

BUILDER'S NEW GUIDE,

SHEWING THE IMPROVEMENTS UPON

CARPENTRY AND JOINERY,

SINCE THE DAYS OF THE LATE MR. NICHOLSON.

EDITED BY JOSEPH GALPIN, ARCHITECT,

ASSISTED BY

MANY OF THE MOST EXPERIENCED MEN IN THE TRADE,

WHOSE NAMES WILL APPEAR IN THE WORK.

The Joiner's Arms, Crest, and Motto.

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PREFACE.

SHOULD it be inferred, from the title of this Work, that I cultivate a disposition to produce it in opposition to that of the late Mr. NICHOLSON, or in any way to lessen his standing, or deprive him of the merit due to him as an author, I will at once remove any such impression, by proposing to erect a monument to his memory, (so that we may have to boast of having one monument belonging to the craft); for it should not be forgotten that in his time there were but few studious men compared with the present day. Since the establishment of Mechanics' Institutions, Drawing Schools, and a variety of other establishments for the improvement of the mechanic, almost every man is now become a thinking one; so that well may this be called "the age of improvement." Whether we look at the gas in our streets, the influence of steam by sea and on *terra firma*, above all, the electric telegraph, it must be admitted that extraordinary improvements have been made in every branch of art within the last half century. Could the great Watt have visited the Machinery Department in the Exhibition of 1851, would he not have found the Steam Engine a very different thing from what he left it? But as one man improves upon the talent of his predecessor, both in machinery and other branches of art, so has it been with Carpentry and Joinery, and every branch of Building, since the days of the late Mr. PETER NICHOLSON. Why, then, it is asked by the majority of the craft, should not such improvements be published for our information and guidance? And why should not those persons competent to do so, follow his manly, noble, and generous example, instead of hiding their talents under a napkin? Now, from my extensive connection, I can give the explanation — viz., some will not do it from what I deem false delicacy, and others will not sufficiently devote their time to its necessary study and application, and after all, incur the great outlay of engraving, printing, and publishing (which, by the bye, I know from experience is altogether a weighty matter); I have therefore, at last, at the request of many friends, consented to undertake the task, upon the promise of my numerous acquaintances giving me their kind assistance, by subscribing towards it the result of their respective studies and

experience for the benefit of the Subscribers generally, in order that they may get value received for their outlay in every Number. The practical results of the studies of the MANY cannot possibly fail to produce such an abundance of useful information which it would be impossible for any ONE man, be he ever so talented, to produce. I consider it the duty, then, of an author to give his patrons every possible information in his power, from whatever source he can get it, without sparing either trouble, time, or expense. Upon the above principle, each will get the others' heads on his own shoulders, and benefit the whole community. The late Mr. NICHOLSON never could have produced his works, had he not had such assistance. The only difference, then, is, he published every Diagram as his own production, whilst I affix to each, not my own, but the names of the parties who deserve the merit of it; so that I stand, as it were, in the character of the focus merely; and if the rays of every valuable idea from the mechanic, east, west, north, and south, and all the intermediate points, should be brought into that focus, the Work must evidently prove itself a masterpiece.

I consider it my duty, before I close this Preface, to offer my grateful thanks to the Subscribers of my former Work on "Staircasing and Handrailing," (amounting already to upwards of fifteen thousand), for their kind patronage, and particularly for their handsome Testimonials on the merit of the Work. It cannot but be pleasing and satisfactory to me to learn that I have not had forty years' experience without some good result growing out of it, affording me a stimulus to undertake this my last production, which I shall endeavour to make of special benefit to the present as well as the rising generation.

JOSEPH GALPIN, ARCT.

ACTON STREET, GRAY'S INN ROAD, LONDON,

20th February, 1855.

ON BUILDING.

THE most unpardonable thing of all in Building is carelessness in Foundations, particularly on faulty ground. Were I to enumerate the whole of the truly sad results which I have witnessed, from the building of the new Custom House in London, down to the present time, it would produce a lamentable volume. I cannot refrain from saying something more on this subject than I should otherwise do, seeing, both right and left of me in the town where I am now writing, one of its largest and most elaborate Buildings (but just completed) crippled and sinking on every side. One of our principal Theatres also has its Walls bulging out to an alarming extent. If the *pro-tem.* Tye-beam, which in a subsequent page I recommend being introduced into such-like Buildings, had been adopted in this last case, the evil would, in some degree, no doubt, have been obviated —in fact, it would, in my opinion, have been altogether prevented; but all the expensive means which may be subsequently used to secure the superstructure avail but little, particularly whilst it rests on an insecure Foundation. One-twentieth part of the expense, so involved in the structure first alluded to, would have secured an adamantine Foundation.

I feel it, then, a duty, whilst writing on the subject, to animadvert on (to say the least of it) such indiscretion.

If I mistake not, Dr. Franklin said that, "Those were not the wisest men who did not learn in the school of experience;" but here even experience seems to teach no lesson. One public Building is seen bulging out, and its Walls overhanging to an extent which cannot possibly be unobserved even by one unconnected with the Building Trade; and yet,

notwithstanding this glaring mishap, staring them in the face (the cause of which cannot possibly be mistaken), they follow in the same wake—they steer the same course—and the result is, they founder, like the rest, and involve much anxiety, much expense, and much reflection; all of which might have been obviated by learning a lesson from the indiscretion of others, and taking precautionary measures at the first out-set; the additional expense of which would not have required one-twentieth part of what it costs to hold the superstructure together, besides losing what ought to be the honest ambition of every man,—the credit of building like the wise man of old, who "built his house upon a rock."

To revert again to the carelessness in Foundations:—Little heed seems ever taken of the surface or bed, upon which the first course sets. The last Foundation I saw excavated, the whole of its surface, or bed, fell *under a level outwards.* Why it was so done I cannot say: the excavator might have been what by some is called a one-sided workman, or he might have had an idea that by so cutting the Foundation, the Wall would draw itself outwards. But see the evil of this thing, which seems never noticed, thought of, nor cared about; but trifling as it may appear, it is a highly important matter: for since all Buildings have a tendency to fall outwards, how much does not this inclination (outwards) tend to promote it? Here the reader may very naturally conclude that I advocate a level bed; but this is not the case, for the chances are that the Walls raised from such a bed are as likely to fall outwards as inwards. My impression is, that the bed upon which the first layer of Foundation is laid should not be level, but have a fall inwards. For if the fall of bed, as first spoken of, promotes the falling of the Wall outwards, it must evidently follow that if that inclination is reversed, it must have a tendency to counteract it. I come now to another common every-day, but nevertheless very serious, error in building on Foundations. The general rule is, when the Foundation is laid, to raise the Walls from its centre, leaving the same projection of Foundation inside as outside. Now this, in my opinion, is bad in principle; for when the Wall is so raised, its weight upon the Foundation compresses the earth equally inside

and outside; hence there is no available means of preventing the Wall falling outwards, except by raising the Walls upon the Foundations, leaving two-thirds of the Foundation outside, and but one-third inside. You then get a counteraction against the Wall falling outwards, the weight of the Wall being brought so near the inside of the Foundation, the greater compression must naturally be in the inside, which must evidently tend to throw the Wall inwards. When a Wall is raised from the centre of a Foundation, experience tells us that such Wall generally inclines outwards; but by placing it so as to leave two-thirds of additional breadth of the Foundation outside, and but one-third inside of the vertical Wall, it must evidently do much to resist the general evil. But the most substantial plan of all is, to carry it up on the Buttress principle, beginning the Buttress to the extreme of the outer two-thirds projection of Foundation, and diminishing it to nothing on reaching the line of plinth or ground-floor, viz., to let your outside Wall, from the Foundation up to the ground-floor line, constitute an ordinary Buttress. This, together with the Foundation and Wall being raised as above described, is the safest plan that can be adopted.

Before I close this subject, there is another apparently trivial matter connected with carelessness in Foundations, which ought not to be lost sight of. I have known Foundations excavated, and when the Building comes to be set out, the excavation is not exactly in its place; and to save further cutting outside, the front of the Wall has been carried up perpendicularly with the outside of the Foundation (just the reverse of the principle I have laid down). I have heard the workmen remark in such a case: "It will just do."—"Go a-head." But before the Walls are one pair high, on applying the plumb, they find the Wall falling outwards, but for what reason they cannot tell. "It was plumb on Saturday night when I left it, but now it is falling outwards! I cannot think how it is!" they exclaim. Now, my remarks above fully answer the question.

With regard to artificial Foundations, I should recommend concrete where fitting materials can be had; but in localities where it cannot be obtained, the old custom of Pile and Plank is probably the best substitute. In either case the additional projection of Foundation outside the Walls,

even in this, should not be forgotten; but I would observe that both the Piles and the Plank should be charred. I have seen very old Timbers, that have been buried underground many years, as sound and perfect as ever, from the circumstance of being charred before their insertion. It has been said, that the piles driven at Dover Harbour, which were charred at the time of the landing of Julius Cæsar, are perfectly sound at this very time. From this circumstance I would recommend all Timbers used underground to be so prepared; but in any locality where Davidson and Symington's Desiccating Process is carried on, I should prefer sending the material through their non-solutionising process, which is, no doubt, the best thing ever yet discovered. The testimony of Mr. Wightman, on the state of the sleepers on the Blackwall Railway, is one proof of its efficacy. Inverted Arches, when carefully inserted upon the principle which I have previously laid down, have also their importance in the relief of Foundations, and should invariably be inserted over any particularly faulty part of a Foundation, throwing the weight on the more substantial bed.

This is one means of obviating settlements in Walls; but there are many other precautions essential to be observed to counteract the occurrence of Settlement. If, for instance, a Building is raised in a neighbourhood where stone is used, much depends upon the average size stone, and the thickness of the Wall. If the stone should run from 6 to 12 inches, this would give a good key for 18 or 20-inch work; but supposing the Wall was required, say, 2 feet 6 inches in thickness, great care should be used in the filling in of the centre part of the Wall, where the average length of stones would not reach properly to key each other. This vacuum is, as every experienced man can testify, too often filled in with small chipping stones, with but little mortar to fill up the vacuum. The same rule is applicable to stone of any other size bed; but in any particular case, where the peculiar character of the stone will not give a good embedded key to the particular thickness of the Wall required, such Walls I would recommend being well grouted every alternate course.

The intersection of dry stones, without mortar to adhere them together, cannot produce any strength; great care should therefore be taken in filling

with mortar every crevice the irregularity and excrescences the stone produces, and the honest and experienced Mason will smite his hammer on each stone as he lays it, thus compressing the mortar in every joint *whilst fresh*,—not merely laying the stones on, and leaving the coming additional weight to compress *the mortar when half set*, the work thereby losing much of its strength. The want of due attention to this is, no doubt, partly the cause of settlements in Buildings; but such results arise also from other circumstances,—the carrying up of Walls "scaffold-high" in parcels,—through having too limited quantity of scaffolding, the workman being driven to carry up his work by piecemeal to a height of 4 or 5 feet, the length of his scaffold only, instead of carrying the courses uniformly around the Building, breaking joint with every additional layer of stone. The principle of building Walls in this way is bad, and cannot be too much deprecated. The Proprietor, however, is more blamable, in many instances, than the Builder, by unreasonably cutting him down in price, and thus driving him into the error. The non-introduction of Chain or other bond-timbers, too, is another cause of settlements. In fact, even where they are sometimes introduced, they are so inserted as to be of little service to the full tie of the Building. They are too often thrown in in short lengths, and merely abutted together, losing much of their intended value to the Building.

Great care should be taken, to have such Timbers of the longest lengths obtainable; and where they meet, they should be well united together by scarping or otherwise. This should be observed at all the angles of the Building, so as to form a bond, as it were, of one unbroken piece, or "adamantine chain," throughout the whole range of the Building.

The number of the tiers of bond should be governed chiefly by the height of the Building; but the character of the Foundation, and the extent of the Openings, should also have their due consideration.

The principle of having all Timbers (whether running longitudinally or transversely) in one length, or uniting them as above, should be observed, whether in Plates, hanging Purlins, Joists, or any other such-like material in a Building.

The security of walls depends much on the manner in which the Joist is inserted. Where Beams are used, they are generally placed transversely, and the Joists inserted longitudinally at *every floor;* but where naked Joists are introduced without Beams, two things should chiefly be observed,—the one is, to insert the Joists into such Walls as require holding together, which is generally the longitudinal; the other is to give them (the Joists) the shortest bearing. But where there is no weighty objection, it is well to reverse the line of Joist at every succeeding floor. In Chapels and other Public Buildings, where the longitudinal Walls have no Joists to hold them together, the Author would recommend temporary Timbers being thrown in across, here and there, in the character of Tye-beams, to remain until the Roof is on and the Walls settled; this will tend to hold the otherwise swagging Walls together; and when such timbers are cut off, on the completion of the work, the little waste of the ends left into the Walls is of no consideration, compared with the value of their *pro-tem.* insertion.

It is important, as there is always a springing disposition in wood, that the eye of the workman should at all times be directed to this, so as invariably to put the comber edge upwards; this should not be lost sight of in any single Timber throughout a Building, as the flagging of such Timber would be much counteracted by an observance of this rule. Where Joists must unavoidably have a long bearing, bridging does much to strengthen them; but the bridging should always be partially halved together, which will add greatly to its intended stiffness. The Joists, too, under such circumstances should have a good bearing on the Walls; the further the Joists run into the Walls, the more the weight of Wall above it has a tendency to counteract its flagging.

I shall now speak of what I consider the best and most effectual means of preventing damp arising in Walls from their foundations, which unquestionably in many, if not in the majority of Buildings, is the forerunner of the dry rot; and hence especial care should be taken to obviate this insidious and destructive disease, and all the evils which

arise from it. The way in which I have always effected this, and which I recommend as the most effectual and inexpensive remedy, is to imbed in blue lias or Sheppy stone cement two or three layers of Slates; this will at once prevent it, and according to the analysation made by Dr. Borelace a few years ago, the Delabole Slates, being, as he states, altogether impervious to the absorption of any moisture whatever, are the best to be recommended; but where such Slates are not to be obtained, the Bangor or Caernarvon may be substituted; and in any neighbourhood where it may be difficult or too expensive to get either, in such a case I would use hard-burnt Pantiles instead; but much care should be observed, that the sand mixed with either Cement should contain no *salt* property in it. This layer should be placed on the last course up, to receive the basement, if any, otherwise the Ground-floor Joists. The same things should be introduced also under the whole of the Partitions, as well as around the principal Walls of the Building.

The next most prevalent cause of Dry-rot, in my opinion, arises from the Woodwork of Buildings being prematurely fixed against the Walls before they are perfectly dry. It is very reasonable to suppose that if any Woodwork, such as Grounds, Dados, Skirtings, Linings, &c., be affixed to the Walls before perfectly dry, the damp arising from the subsequent sweating of them, and the proximate connection of such Walls and Woodwork, will cause the pores of the Wood to absorb the moisture, and hence must inevitably produce this sad result. Nothing, therefore, can show a greater want of discretion than to neglect this very important precaution.

In Walls also that are required to be built under the surface of the ground, the earth thereby setting against it, it would be well (provided the expense of building a Dwarf Wall, leaving a vacuum of 12 or 18 inches between, be an object) to fix at least one layer of Slates or Tiles in Cement, as before described, to keep this part of the Wall dry and healthy.

To obviate the decay of such parts of Timber as are imbedded into Walls, let them be fixed without mortar setting against them, and with dry Slates.

Take, for instance, the ends of the Joist: if 9 inches in depth, fix them

between two Countess Slates, or if 11 inches, between two small Duchess, Slates, fixing a fillet of Slates at the ends and top and bottom of the Joist, placing the Timber into a dry slate case, without any mortar between the Wood and Slates; and whenever any Woodwork is so inserted into the Walls, it will ultimately be found that such Timbers are as healthy and durable as the naked timbers themselves.

I shall now speak of the discretionary care required in fixing the ground-floor line of Buildings, and strange as it may appear, the majority of our Architects are too apt to commit themselves by setting out Buildings too low; many fall into this error from the circumstance of looking only to the *immediate* Ground Line, whereas, probably, the ground at a distance of some hundred or two feet off may stand higher than the site of the Building; and hence in a heavy storm, or even in a moderate shower, the water finds its way towards the Building instead of running from it, keeping at least its entrance constantly wet, dirty, and disagreeable. But many more evils than this grow out of this oversight.

The appearance of a House has always a much better effect when standing on an inclined plane. I recollect, a few years since, giving a Plan for two Houses on a leasehold estate, called Bridge Meadow, held under the Corporation of Bridport. I fixed the ground-floor line of both houses the same, but one party grudging the trifling expense of raising the ground, kept considerably under. The result was that no passer-by would believe them to be the same planned houses: the one, not having its ground-floor line on an inclined plane, looked mean and insignificant when compared with the other, having at all times in wet weather its approach but little short of a quagmire. I will venture to say that if both Houses were to be sold to-morrow, the one would fetch at least one-fourth more than the other, being a sum ten times more than the cost of raising the ground in the first outset. But this is not all: in the one, the drainage had so little fall that it was a constant nuisance and expense; whilst the other, having as much more fall as the difference of the heights of the ground-floor lines, was never found disagreeable.

Having stated above, that the majority of Architects, in reference to the setting out of ground-floor lines, do oftentimes commit themselves, I may be excused in pointing out at least one other instance of it. I will name, then, the two first mansions in the Kensington-Palace Gardens. The proprietor, being a friend of mine, submitted the Plans and Drawings to me for my opinion. I immediately deprecated the height fixed for the ground-floor line, and by my suggestion it was raised; its approach thereby being on an inclined plane, the entrances are high, dry, and healthy, besides the buildings shewing themselves of much more consequence, and at the same time obviating all those evils above described. I could quote many similar instances, but consider this sufficient caution to avoid falling into this every-day error.

Respecting the size of Drains, much will depend on circumstances; but in all cases the above suggestion, of keeping the ground-floor line well up, must improve the run or fall; in fact, every inch the ground-floor line is kept up, it must be evident it will give that inch more fall; and if there were no other reason for doing so, this, particularly on a low or flat situation, would be sufficient. There was much contention between the old and new surveyors in London at the time of passing the new Sanitary Act. In my humble opinion both went to extremes: a full description of the two principles laid down by them will be found in the *Builder*, published at the time of passing that Act.

Having previously animadverted on the prevalent indiscretions in the carrying out of the different parts of a building coming in any way under the province of the Builder, I shall now give that which chiefly concerns the Architect and Builder of the highest class, namely, the utter want of taste (for I can use no milder term) of not providing for the seclusion of every thing in the shape of Water-pipes, whether they proceed from the Roof, the Dressing Rooms, the Closets, or any other part of the Building.

How any Architect can possibly produce an architectural and chaste elevation, which would otherwise call forth the admiration of even the connoisseur himself, and allow it to be botched by those unsightly vessels

staring every passer by in the face) by being introduced, either into the angles of a projecting elevation, or some other conspicuous part of the Building, seems to me to be a most upardonable negligence, on the part of the designer. For an Architect of any pretensions to give a design, where an expensive and elaborate cornice, and probably strings and plinths are introduced, the mitered intersections of which give it boldness and beauty, and then allow such mitered intersections to be ruined by the insertion of unsightly water pipes, particularly when placed in such angles, is to me really unaccountable. The mitered intersections are the very life and beauty of an Architectural Building; and yet, strange to say, the liberty taken with them as above described is of every day occurrence, not only in the metropolis, but in almost every town I have ever visited. I refrain from signalizing out any particular Buildings here, or making any personal remarks.

I will now speak of the additional strength which the depth of timbers give over their thickness, whether in Joists, Purlins, Rafters, Tye Beams, or any other timbers. Compare the ordinary proportioned Joist laid flat on its bearing, without being laid on its edge; this will at once be sufficient to shew the value of the comparative depth of timber over its thickness; in fact where you have long bearings for timbers, or where much weight is to be brought upon them, you can scarcely go to an extreme by giving them unusual depth. The same thing applies to Iron Girders, Lintles, Corbels, or any other such-like supporting member in a Building.

We now come to that abominable nuisance "the Smoky Chimney:" it is so universal that no wonder so many hundreds of heads have been at work year after year, and so many thousands of pounds expended in the endeavour to obtain some *bona-fide* remedy, that would prove successful in all situations, and under all circumstances.

Count Rumford devoted the best part of his life to the study of this subject, but after all his experiments, he failed in establishing a fixed

principle applicable to all cases. This is much to be regretted, if only for the sake of getting rid of the varied, unsightly, and for the most part useless, expedients fixed on the chimney-tops. How many architecturally chaste and beautiful buildings do we see spoiled by the introducing of these (I know not what better to call them) unsightly crests to the chimney-shafts, which are presented on every side, from Somerset House and the Royal Exchange, down to the smallest and otherwise happy-looking domicile!

My opinion is, that those persons who go to the top of the chimney to remedy the smoke-nuisance, evidently go to the wrong end. After so many hundreds of experiments that have been made, from time to time, proving that if precisely the same project be introduced at the top of two chimneys of contiguous houses, both built on the same plan in every way, and by the same workmen, in one case it may effect a cure, but in the other an entire failure; and even beyond this, in some instances aggravate the prior evil. I therefore come to the conclusion, that there never will be any effectual scheme of contrivance on the chimney-top. Nothing can prove effectual but the producing a current of air rushing from the fire up the chimney, to a degree more than sufficient to counteract the density of the smoke, or the flapping wind at the top.

With regard to converting the vacuum of roofs into bed-rooms, which is no doubt done, in the majority of cases, under an idea of economy, it should first be considered that to rooms so constructed there are many objections. Such rooms cannot be healthy. The influence of the sun on the slates in the summer is very great, and the smallness of the aperture in the casement of the dormer window, cannot possibly ventilate sufficiently to make it so—this degree of heat is objectionable in the summer; and in the winter, such rooms are always found much more disagreeably cold than the rooms on the floors

below; and were you to make an estimate of the expense of carrying up the height to obtain square rooms, instead of availing yourself of the vacuum of the roof only, or particularly where you have (which you must have in all narrow spaces) to block up upon the tye-beams, and build up your walls so high, you would find the difference very trifling indeed. To prove this, first make up your estimate, in the following manner:—take out your bill of quantities, and price it out at prime cost for every thing. Walls, plastering, roofing &c. &c., above the height of your top-floor, first upon the principle of forming your rooms in the vacuums of the roof. Then take out your quantities, and money it out upon the *vice-versa* principle of getting square rooms underneath the roof. This will at once give you the difference between square rooms, one of which would be worth the whole area of the other principle, as you would then find. After getting the additional expense of the dormer windows, instead of windows in the walls, the openings of which would so much lessen the brickwork, take the necessary additional height of loops to form rooms in the vacuums compared with the pitch of roof only otherwise necessary. Then take the blocking and bolting on the Tye Beams, and the brick-work up to the height of this, or otherwise, take the ashlering and plastering thereupon, in lathe-work instead of plastering upon the walls; keep in view, at the same time, how much the rooms by the ashlering would lessen their size, compared with building the rooms square; take also the difference of the additional height of the brickwork in the gable ends, occasioned by the difference in the pitch of the roof, together with the additional plastering upon lathes on the rafters, instead of plastering otherwise on the walls,—and you will find by any correct calculation that the difference of building square rooms will not exceed that of forming your rooms in the vacuum of the roof. Then look at the comfort of the one compared with the other; for it must be admitted, that the influence of the sun on the slates in the summer renders the bed rooms hot,

and unhealthy, and are in the winter excessively cold. Look at the difference, also, in the appearance of the building, whether you take its elevation or otherwise; this alone would much more than outweigh any trifling difference should, there be any, in the expense.

In such cases where the vacuum of the roof must be made available, the best means to obviate these influences is to fill the vacuum between the rafters with reed as drawn by the thresher, such as is commonly used for thatching of roofs, nailing a plastering lathe across the rafters, here and there, to keep the reed in; then plaster upon the reed, if necessary, and this will in a great degree obviate the evil.

I will now speak of Architectural design. There are a class of persons who assume to give a correct architectural design, but, when it is produced, it will often be found to contain two distinct styles of architecture, arising either from incompetency, or, what is worse, from some crotchet of their own; and the rules laid down by our architectural fathers are set at defiance. It is true that in many places, particularly in small towns, where a building beyond the ordinary class is seldom erected, no professed architect is to be found: the builder will naturally say, "You have no right to expect in me sufficient experience to carry out the strict rules of architecture. This may be so, but it is not a satisfactory excuse, particularly in our day, when any one may go to, and return from, in one day a town of some standing, and either get a sketch from an architect for a mere pittance, or may himself copy from any elevation which he could easily understand to be a good one.

If he cannot do this, he will be prudent if he confines his ideas to what I term a brick-and-mortar building; and even here some caution is required in avoiding the extremes of too much plainness, or superfluous ornament. The cost of such ornaments would be much more discreetly applied, by adding something to the stability of the building.

Much care is required in ascertaining the due proportions and situation

of your openings, neither allowing too much dead wall from window to window, nor too little, and observe the same rule from door to window, and from window to parapet, or cornice, (provided you have any); and should a parapet be introduced, do not make it outrageously high, beyond the laws of proportion, as in many country towns is too often the case.

ON SEASONING OF WOOD.

THE seasoning of wood, in my opinion, is best effected by Messrs. Davidson and Symington's patented dessicating process, but which cannot be done otherwise than by motive power. Their principle of seasoning wood is precisely the same as seasoning in the usual way, by the influences of the sun and wind—the only difference is, that they carry it out to a greater extent; for instance, a chamber is first provided to receive the boards, planks, scantlings, &c., each piece kept separate, then the chamber is first brought up to the natural heat of a summer's day, and a current of heated air is carried through the chamber, by means of a fan the velocity of which, and the degree of heat, is regulated according to circumstances, beginning moderately, and at the finishing of the process the heat is brought up to a degree equal to the tropics, and the current of air up to a hurricane, by which two extreme influences, they maintain that all the noxious property in the material, otherwise subject to shrinking and expansion, is got rid of; besides it has been proved that timber thus prepared is less subject to rot than otherwise. A part of the sleepers of the Blackwall railway were so done some years since, and are now as sound as when first laid, whilst the others have gone to decay. The process may be seen at any time at the Company's establishment, at Plough Bridge, Rotherhithe, where licenses are granted for its use in any part of the kingdom.

ON PLANTING.

THIS is a subject, in my opinion, of paramount importance, and yet (except in a few solitary instances) it is entirely lost sight of. I allude to the general mode of planting with a view of giving adornment and beauty to the building it may surround. My object in speaking on this subject is, to deprecate the every-day plan of planting skeleton trees and shrubs which nature makes bare one-half the year, instead of planting evergreens, which give the same life and beauty all the year round; nay, many, such as the laurentine by its flower, and even the ordinary holly by its berry, present the most beauty in the winter season, when the skeleton tree looks poor and meagre, and is anything but the ornament intended. But this is not all: the fall of the leaf of the latter is a great nuisance in the autumn, and the dead leaves are also considered injurious to the soil. I knew one gentleman who carried out my recommendation to its full extent, even every hedge on his domain was thus planted, chiefly of the ilex, oak, and common holly, the beauty and effect of which could not fail to be the admiration of every one who witnessed it, particularly in the winter season, when the surrounding country presented its cold and barren character. Evergreens give much life, beauty, and cheerfulness to a domain, without which the same residence would look cold, barren, and cheerless.

ON STRIKES.

THERE never was a single individual, I think, who has ever had anything to do with strikes, but on reflection must feel satisfied that it has, in many instances, done much mischief both to master and man. I could here depict many very sad consequences resulting on the part of the master, and, as well, the misery which strikes have, in many instances, brought upon the workman, his wife, and family; but as my object is not to give so much a history of the evils of the past, as to lay down a remedy to obviate future misunderstandings, I shall, in the first place, say "the labourer is worthy of his hire." Then the question comes, Who is to judge of the value of his services? I say, neither the man himself nor the master. Whenever two individuals only fall out, each considers himself right in his own estimation; and it is thus between master and man. It is very natural that each should look partially on his own side of the case, and hence the uncalled-for disagreement.

I have been both master and workman, but now I am neither: hence I will, being altogether disinterested, venture to give my opinion upon the best course to steer when any discontent arises. In the first place, I think no man is justified in taking advantage of the master, under circumstances where he has framed his estimate with no anticipation of a rise of wages. It is right to give him notice that in any future contract you shall expect your sixpence per day more; and then in this, or any other case, propose a respectable man on either side, and choose an umpire, whose decision shall be adopted by both master and man; hence the misunderstandings on both sides will be done away with.

Having now treated upon the various subjects as proposed in the general outline of the work, I now close the present volume, and take this opportunity to thank the several parties who have enabled me to complete it by sending such contributions of improvements in Carpentry and Joinery as, I doubt not, will be found both interesting and useful to the Subscribers.

J. GALPIN.

GENERAL OUTLINE OF THE WORK.

Besides exhibiting all the improvements in Carpentry and Joinery to the present time, this Work will treat on the too-prevalent carelessness in constructing Foundations, particularly on treacherous ground, and of the importance of not only laying the Foundation with all due caution, but the carying it up to the ground-floor line upon the Buttress principle, which to some has been altogether unknown, and by others disregarded.

On the best and only effectual (yet simple and inexpensive) means of preventing Damp arising in Walls from their Foundations, thus obviating one of the supposed causes of dry rot.

On the evil results of setting out Buildings too low, as well as on the fallacious practice of governing the ground-floor line by the site ground-line, regardless of connecting circumstances.

On the result of good or bad Drainage, partly growing out of the above circumstances.

On making, by simple and inexpensive means, such parts of Timber embedded into Walls equally durable with their naked parts.

On the oversight of not preparing, at the commencement of a Building, for the bringing down water from the parapets and roofs, dressing-rooms, and closets, so as to seclude the water-pipes, and on the unsightliness of exhibiting such pipes on the outside of Buildings.

On the advantages of the depth of Timbers or Scantlings over its thickness in producing strength, and on the discretion required in framing the Table of Scantlings by its proportionate bearings.

On the construction of Chimneys. The sad results growing out of the smoke nuisance, as well as the unsightliness of the various attempts (but nearly uniform failures) of remedy on the Chimney top, having in no one instance anything like a certain principle of producing the necessary current, under any circumstances; with the Author's opinions in favour of a principle which cannot fail not only to supersede every other project, but truly and

effectually to effect a cure without the possibility of failure, in any case and under all circumstances, as well as at the same time effecting that ventilation in dwellings so much desired.

On the advantages of longitudinal, transverse, and other Timber being in one length, instead of abutting to each other in all cases, but more especially in Buildings on a treacherous foundation.

On the indiscretion of making, and the consequent want of health in, Bed-rooms formed in the vacuum of a Slated Roof, shewing the advantages and comparatively trifling expense of carrying up the Walls, giving square Rooms, and greatly improving the external appearance of the Building.

On the best means of preventing heat in the summer, and cold in the winter, from Slated Roofs, where required for any purposes for which the vacuum may be used.

On the impropriety of introducing two opposite styles of Architecture in the same Elevation, or any other part of a Building.

On the inconsistency of extremes, whether it be in the too plain, commonly called the "brick-and-mortar Building," or the superfluously-ornamental, Elevation; with a few remarks on the too-common misapplication of any favourite ornament that is introduced.

On the seasoning of Wood perfectly, so as to obviate shrinking under any degree of heat, or expansion under any degree of dampness, giving a full explanation of the value of the new dessicating, over any solutionising process extant, making the material at the same time impervious to the infection of the dry rot.

On Planting.

On Strikes.

The Miscellaneous Remarks will contain much information on various subjects, affording everything useful for the young Builder, so as to place him in a situation to become a complete master of his business, whether in delineating a Plan, or carrying it out in the most correct, economical, and business-like principle, at once avoiding all those every-day habitual errors by which many persons sooner or later lose their reputation.

REFERENCE TO PLATE II.

First it may be observed that Plate I. resembles a somewhat similar section to Plate II., the variation being caused by the difference of the vertical planes; now it will be seen by the first Plate, that the incline on each side is equal and similar, but in Plate II. the inclines differ; the rise of the first being equal to D, F, and that of the second equal to D, E.

To make this Plate as plain as possible (as it contains the fundamental principles of sections of solids, of all descriptions, whatever be their base, and is of particular advantage in handrailing), we shall now explain the method of finding the section, and also the bevils if applied at right angles to the sides *b*, *d*, and *b*, *e*,* first make the base A, B, C, D, and draw the line A, C; and perpendicular to A, C, draw A, *b*; parallel to A, C, draw *a*, *c*, at any height; make *a* 1 equal to the height of the first vertical plane, and 1 *b* equal to the height of the second; draw the line *b*, *c*; produce D, A, and make D, E, equal to 1 *b*, and D, F, equal to *a* 1, with *c* and *b* as centres; and F, C, as a radius; describe an arc at *d* and *e*, and again with the same centres, and with C, E, as a radius, intersect the other arcs at *d* and *e*, and join *b*, *e*, *c*, *d*, and it will be the section required.

To find the directing ordinate, draw 1, 2, parallel to *a*, *c*, and 2, 3, parallel to 1, A, draw 2 *d*, and 3 D, which are the directing ordinates; and it may be remarked that any figure inscribed in, or described about the base, the section of it may be traced by ordinates.

It may also be remarked that if 3, D, and 2, *d*, are equal, the work is right.

To find the bevils: with *d*, and *e*, as centres, and the base as a radius, describe arcs a 4 and 5, and with *b*, as a centre, and C, E, as a radius, intersect the arc at 4, and draw the line *b*, 4; in *b*, 4, make *b*, 6, equal to D, F, and draw *e*, 6; then *e*, 8 is the bevil stock, and 6, 8 the blade; with the base as a radius, and *e* as a centre, describe an arc at *b*, again with 8 as a centre, and 6, 8, as a radius intersect the arc at *b*, and draw 8, *b*, and it will be the bevil for the side *b*, *d*; again with *b* as centre, and radius D, F, intersect the arc at 5, draw *b*, 5, and produce it to 7, make *b*, 7, equal to D, E, and draw *d*, 7; with *d* as a centre, and the base as a radius, describe an arc at *g*, and with *e* as a centre, and *e*, 7, as a radius, intersect the arc at *g*; join *e g*, then *d*, *e*, *g*, is the bevil for *c*, *d*, or *b*, *e*.

N. B. We shall give the proof of the bevils for those who wish to investigate this theorem.

Let $b =$ the base h and $'h =$ D E, and D F, then $(b^2 + h^2)^{\frac{1}{2}} = b.d = s$, and $(b^2 + 'h^2)^{\frac{1}{2}} = b\,e = 's$ then by similar triangles $s : b = 'h\,\frac{b\,'h}{s} = 6, 8$, and again $b = h, : \frac{b\,'h}{s} \cdot \frac{h\,'h}{s} = b, 8$: Now if $'S^2 (\frac{h\,'h}{s})^2 = b^2 + (\frac{b\,'h}{s})^2$ the method is correct, because the point *e*, and 6, meet at right angles on the opposite side of the vertical plane; then by transposition $'s^2 = b^2 + (\frac{h\,'h}{s})^2 + (\frac{h\,'h}{s})^2$. Now as $b, 'h$, and h, may $=$ any quantity, let $b = 10$, $'h = 20$ and $h = 30$; then $S = \sqrt{1000} = 10\sqrt{10}$ and $'S = \sqrt{500} = 10\sqrt{5}$, whence $'S^2 = 500$. Again, $b^2 = 100$, and $(\frac{h\,'h}{s})^2 = (6\sqrt{10})^2 = 360$, and $(\frac{h\,'h}{s})^2 = (2\sqrt{10})^2 = 40$ and $100 + 360 + 40 = 500 = 's^2$.

* It would be advisable for the young student to cut a block at any angle he pleases, and practise upon it, as it will strengthen his ideas, and make the operation much easier and more concise. It may also be remarked, that if the student wishes to inscribe in, or describe any mould whatever about the square, A, B, C, D, the bevils may be drawn outside the Plan, to give room, and make the matter less complicated.

REFERENCE TO PLATE III.

This Plate is designed to shew how to strike out the section of a cylindrical shaft, by the trammil.

It is well known that the section of a Cylinder is an ellipse; consequently any part of it is a part of an ellipse. Now, supposing a piece of rail was wanted to fall over the marked quarter (Fig. 1) at a given height, the first thing to be done is to determine the best position the piece can be fixed in, to get out the thing required. Now the position of the section of the square block (or prism) is the position in which the material wants to lie, which must be found by the manner in which you want to carry up your rail. To make this more clear, let us suppose you wanted to rise a height equal to 3-2, Fig. 2, from B to C, Fig. 1, and a height equal to 1-3, Fig. 2, from C to D, Fig. 1; draw the line 1-3, equal to the greatest height, that is from C to D, and draw 1-5, equal to A, B; and join 5-3; make 3-2, equal to the lesser height, that is the height from B to C; and, parallel to 1-5, draw 2-4.

In Fig 3, draw the base A, B, C, D, equal to A, B; make C, E, Fig. 3, equal to 2-4, Fig 2; draw D, E, which will be a directing line, and perpendicular to D, E; and draw B, F, equal to the whole height the section is required to rise, (*i. e.* 31 + 32, Fig. 2); join F, G, and parallel to B, F, draw *b*, *c*, and A, *e*, cutting the angles A and C; perpendicular to F, G, draw the lines *e*, *f*, *c*, *g*, and F, *j*; make *e*, *f*, equal to *h*, A; *c*, *g*, equal to C, *i*, and F, *j*, equal to B, *j*; join *j*, *g*, *g*, *f*, and it will be the section of a prism, and the reference to the bevils in Plate 2 alludes to this.

To find the length of the ellipse, first strike the semicircle to the dotted line, then the portion B, D, is the part required to go into work; draw the lines 1-2 and 3-4 parallel to B, F, till they meet G, F, produced; through the point *g*, draw *g* 5, parallel to G, F; draw 2-6 and 4-5, parallel to *g*, *c*; then *g*, 5, is half the length of the outside ellipse, and *g*, 6, half the length of the inside ellipse, and the radii of the circles are their heights respectively.

N.B.—If this was intended for a handrail, the height would be taken from the centre of the rail, instead of the outside, as in the present case, and the joints cut square to the side of the section; and also the bevils would be applicable to the centre line.

ROOFS AND SKYLIGHTS.

PLATE V.

PRESENTED BY MR. CLARK,

Shews Plan of a Roof to be covered with Glass. One end of the Building is square, the other end is in three equal cants.

To find the length of Hips, set up the height square from the base of Hip, as shewn by the dotted lines *a f*, which is the length of the Hip, and will give the cut for the top end, by applying the bevil to the raking and perpendicular lines. To find the length of the Jack-Rafters, make the angle at *a* the centre, and draw the curved line from *f* to *i*, then draw the line *a*, *i*, and continue the lines 1,2,3,4, on to the line *a i*, as shewn by the fine lines, which give the length of the Jack-Rafters, and also the side bevil for the heads; the down bevil is the same as that for the heads of the Common Rafters.

PLATE VI.

Shews how to get the section of the Hip, so that the Mouldings will intersect with the Mouldings on the Rafters and Ridge. This method will answer for Roofs and Skylights of almost any form.

APPLICATION.

Draw the angle of the Plate of the Roof, as shewn by the thick lines in Plate VI., at A A A A; draw the base of Hip *b b*; then draw *c*, *d*, *e*, at right angles to *b b*, to cut the Plate lines at *c*, and *e*; draw the line *a f*, to the proper pitch of the Hip, and with *d*, as a centre, make a circular line from the nearest part of the line *a f*, to the base line *b b*, at *g*; then draw the line *g c*, and *g e*, which make the plane of the Roof with the Hip, and by applying the Mould of the common Rafter-square to these lines, and drawing lines through it parallel to *g e*, the proper Hip-Mould may be traced out. The other parts need no explanation.

It will be easily understood, by referring to Plate VII., which is cut so that, when turned up, the lines which represent the Mouldings on the Hip, and the Mouldings on the Rafter, will intersect to a mitre.

REFERENCE TO PLATE VIII.

THIS plate is designed to show the method of obtaining the mitres for splayed linings, or any thing else on the bevil, as shewn per plan.

Let C, B, A, Fig. 2, be the angle or splay; first make the angle C, B, A, Fig. 1, equal to the angle C, B, A, Fig. 2; through any point, A in the line A, B, draw C, D perpendicular to A, B, and A, E perpendicular to B, C; make A, D equal to A, E, and join B, D; draw A, F perpendicular to B, D; and, with A as a centre, and A, F, as a radius, intersect A, B, in G, and join C, G, then C, G, A will be the mitre required.

Fig. 3 is drawn exactly in the same way, observing that if the splays vary, the mitres are applied to the CONTRARY SPLAY from which they are derived.

To prove his work, the operator may proceed as follows; with B, Fig. 1, as a centre, and B, C as a radius, describe the arc C, H, and with F as a centre, and C, G as a radius, intersect the arc in H; join H, F, and if H, F, A are in the same straight line, the work will be found correct.

REFERENCE TO PLATE IX.

First lay down the ground plan, as seen per Plate; strike the design the roof is intended to be, as *a*, *b*, *á*; draw a line from *a* to *c*, touching the rafter or bar on the under side; on the line *d*, *f*, make *d*, *e*, equal to *d*, *c*; with *c* as a centre, and with the radius *f*, *e*, intersect *f*, *a*, in *g*; produce *a*, *c*, to *h*, and at right angles to *a*, *h*, draw *b*, *k*; draw *i*, *k*, parallel to *g*, *c*; draw as many ordinates as are necessary parallel to *b*, *k*, and trace them again parallel to *a*, *i*, and again at right angles to *i*, *k*; trace them from *a*, *k*, to *i*, *k*, as per Plan, and it will give the hip required.

To find the lengths of the jacks,—divide *á*, *d*, into as many parts as there are rafters, and perpendicular to *á*, *d*, draw the lines 1-1, 2-2, 3-3, &c., which will give the joints for the angle rafters or bars.

PLATE XII.

By Mr. Forster, Clerk of Works to Thomas Finley, Esq., London.

The author of this Diagram first produced it under the following circumstances. He was engaged, some two or three years since, in one of the largest Building Establishments in London, at which time the necessary work for the fitting up an Amphitheatre for one of the London Hospitals was about being carried out, and observing that the circular Book-Boards, &c., was intended to be produced upon the old wasteful and expensive system, there appeared to him a possibility of establishing a principle effecting that object with less time and materials, and consequently less expense, (besides giving a more correct and unerring rule). He then began to put his ideas into practice, the result of which was the production of the present Diagram. Upon this principle the work was carried out, the advantages of which over the old system elicited the admiration of the whole of the workmen, and gave great satisfaction both to the Foreman and the Master.

Description of the Plate.—L, fig. 1, represents the Book-Board glued up in thickness on the old system, a plan which was never considered anything but "jog-trot," shewing no more science, skill, or judgment than might have been expected from the hedge-boar Carpenter. A, fig. 2.—The circular Book-Board (as bent round on its brackets). B.—The Mould, being about $\frac{3}{8}$ or $\frac{1}{2}$ inch in thickness; and the curve being large, it may be carried round with facility.

APPLICATION.

First draw the Plan, as shewn, and from the line C D, draw a perpendicular from the point T; then draw a line to the bevil of the Bracket, according to whatever angle it may be, to cut the perpendicular at E, which will be the radius of the Mould required. Divide the line *o*, *o*, *o*, on the Plan into as many parts as possible for the accurate length, and the same number on the developed Face-mould line *o*, *o*, *o*; then take the width of the Book-Board at X, with the radius at E, which will complete the Face-mould. The principle of this Diagram will be found of infinite service in the carrying out of any joiner's work of a similar character.

CARPENTRY AND JOINERY, PLATES XX., XXI., XXIV.

BEFORE giving an explanation to the above Plates, I deem it necessary to make some few remarks on Hingeing.

Hingeing requires much care under all circumstances, but particularly so with regard to Shutters. Let us first consider the Hingeing of an ordinary Door, which is generally hung to a fixed Door-case. The weight of the Door upon the upper Hinge has a tendency to strain, by constant opening and shutting, to a much greater degree than the lower one. In fact, the weight of the Door presses against the lower Hinge, which, if not so well secured as the upper one, rarely gets out of place, notwithstanding it has the same constant action as the upper one: the last, from its additional strain, should be the more carefully secured.

If the Door-case is a rebated solid one, and the screws are of good length and well inserted, the Workman may rest satisfied that all will be right; but where the Door-cases are not solid, but cased against the framed partitions, much circumspection is required in making it, by blocking or otherwise, firm as the solid Door-case itself, particularly at the upper Hinge, which should be fixed with Screws sufficiently long to pass through the Jamb and Blocking into the solid Wood.

There is one other thing I think it well to caution the young Workman upon: viz., on the necessary care required in fixing his Hinges exactly perpendicular, or rather, if any deviation, to keep the under Hinge a little outside of a perpendicular with the top one on the *Knuckle* side, as this has a tendency to raise the Door as it opens, clearing the Floor, and carrying

out to some extent the purposes of the rising Hinge. But should it happen, either from carelessness or the want of a knowledge of this, that the upper Hinge is placed only a shaving without a perpendicular with the lower Hinge, on the Knuckle side, the Door must evidently drag upon the Floor. The bottom of the Door must then be cut to clear the Floor; and hence, when the Door is closed, the draught underneath it becomes objectionable, and is anything but workmanlike.

The necessity for *particular* care in the hingeing of Shutters arises from one Shutter having to support another; as, for instance, A in Plates XX. and XXIV., which has to support the weight of the two other Shutters, B and C: hence, more care is required than would be needed in hingeing a single Door to a solid and fixed Frame.

I have not shewn a Flush Panel in the Shutters of the Diagrams, Plates XX., XXI., and XXIV., the half-inch Panel being lighter for the Flaps hung to the principal Shutter; but in all cases where more security is required, the bead and but, or bead and flush Panel should be introduced. Great care should be taken in the selection of materials for this sort of work; for if it be not put together with materials of the best quality and well seasoned, no workman can possibly make a *lasting* good job. Any materials of a springing nature will very soon disarrange the best-executed work, and become anything but what it ought to be. This applies itself to every other species of Framing; but I shall say something more particularly on this subject in a subsequent part of the Work. I will only here add, that Christiana or Archangel white Deal, or even yellow Pine, is far better than red or yellow Deal, as the sun draws the turpentine out of the red Deal knots, &c., and spoils the beauty of the work.

PLATE XX.

A B C.—The Shutters and Flaps.
D D.—The Supplementary Shutter.
E.—Architrave.
F.—Lining.
G.—Stop Bead.
H.—Section of Sash Style.
I.—Vacuum of Framing.
J.—Lining.
L.—Back ditto.
M.—Vacuum of Sash Frame.
N.—Back Lining of ditto.
O.—Blocking.

PLATE XXI.

A.—Represents the Shutter A, in Plate XX., brought out and closing the Window.

D D.—Shews the Supplementary Shutter also brought out, secluding the unsightly Vacuum.

The further explanation to this Plate is the same as that given in Plate XX.

PLATE XXIV.

A B C and A B C shews the curved Shutters in their position, both in their Boxing and when brought out, closing the Window at night.

D.—Architrave.
E.—Intersecting Lining.
F.—Grounds.
G.—Blocking.
H.—Suffit.
I.—Back Lining.
K.—Outside ditto.
L.—Sash Weights.
M.—Moulded Blocking.
N.—Stop Inside Bead.
T.—Blocking to Boxing.

PLATE XXVI.

Shows the Elevation and Plan of a Window having its Shutters secluded behind its Pilasters.

PLATE XXVII. & XXVIII.

Shows the section of Shutters, Boxing, and Pilasters, as in Plate XXVI., and part section of Shutters, &c., full size.

A.—Inside Lining of Sash Frame.
B.—Pulley Stile.
C.—Back Lining.
D.—Stop Bead.
E.—Hanning Stile.
F.—Blocking.
G.—Shutters closing Window.
H.—Shutters in Boxing.
I.—Part of Pilaster.
J.—Part of Back Flap.
a.—Centre of Hinge.
b.—Radius of Hinge.
c —Face of return of Pilaster.

This plan of Boxing the Shutters by hingeing the pilaster is quite novel, and as easily accomplished as the ordinary method, at the same cost, and being on the square, is much less liable to get out of order.

SECTION OF SOLIDS,

By Mr. H. Pilgrim.

Fig. 1 represents a Right Angular Solid, cut at a given angle. C and D shews the two smaller Vertical Planes, as shewn on Plan C and D, Fig 2. E and B shews the two larger Vertical Planes, as shewn on Plan E and B, Fig. 2. 1, 2, 3, 4, shews the inclined plane, or oblique cut, in the solid.

Fig. 2 represents the method of finding the section of the Right Angular Solid, Fig. 1. A in Fig. 2 shews the Plan or Horizontal Plane, and B, C, D, E, shews the Vertical Planes that are perpendicular from the Plan. 1, 2, 3, 4, Fig. 2, shew the inclined planes. To find the section of Fig. 1, first make the Plan or Horizontal Plane A, Fig. 2; then set up perpendicularly the Vertical Plane B, equal to 1, 2, 5, 6, Fig. 1, from the Plan A, Fig. 2. Then set up the Vertical Plane D and B, 4-3, and draw 4-3 parallel to 1-2; draw the fine lines perpendicularly to 4-3, with the Compasses 1-2, Fig 1, and with the Compasses apply to 1, Fig 2, and cut the line at 1-4, and draw the line 1-4 with the Compasses at 2, strike the fine line at 3, then make the line 2-3, and that will be the Section one way; then by setting up the other Vertical Planes, and taking the radius 5-1, and striking E at the extreme point, draw 1-4 equal to 1-2, the width of the radius 8-4-4, then with the radius 7-3-3; then radius 2-2 will determine the height of the four Vertical Planes, so that the Section can be laid down four ways; and proceed to find the inclined planes as before described, which will be four, that is, 1, 2, 3, 4, Fig. 2.

SECTION OF SOLIDS.

Presented by Mr. PILGRIM

Teacher of Geometry, 3, Swinton Street Grays Inn Road

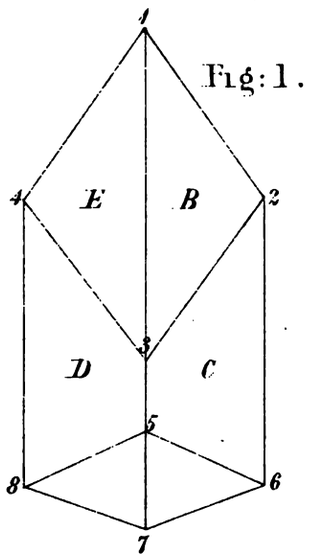

Fig: 1.

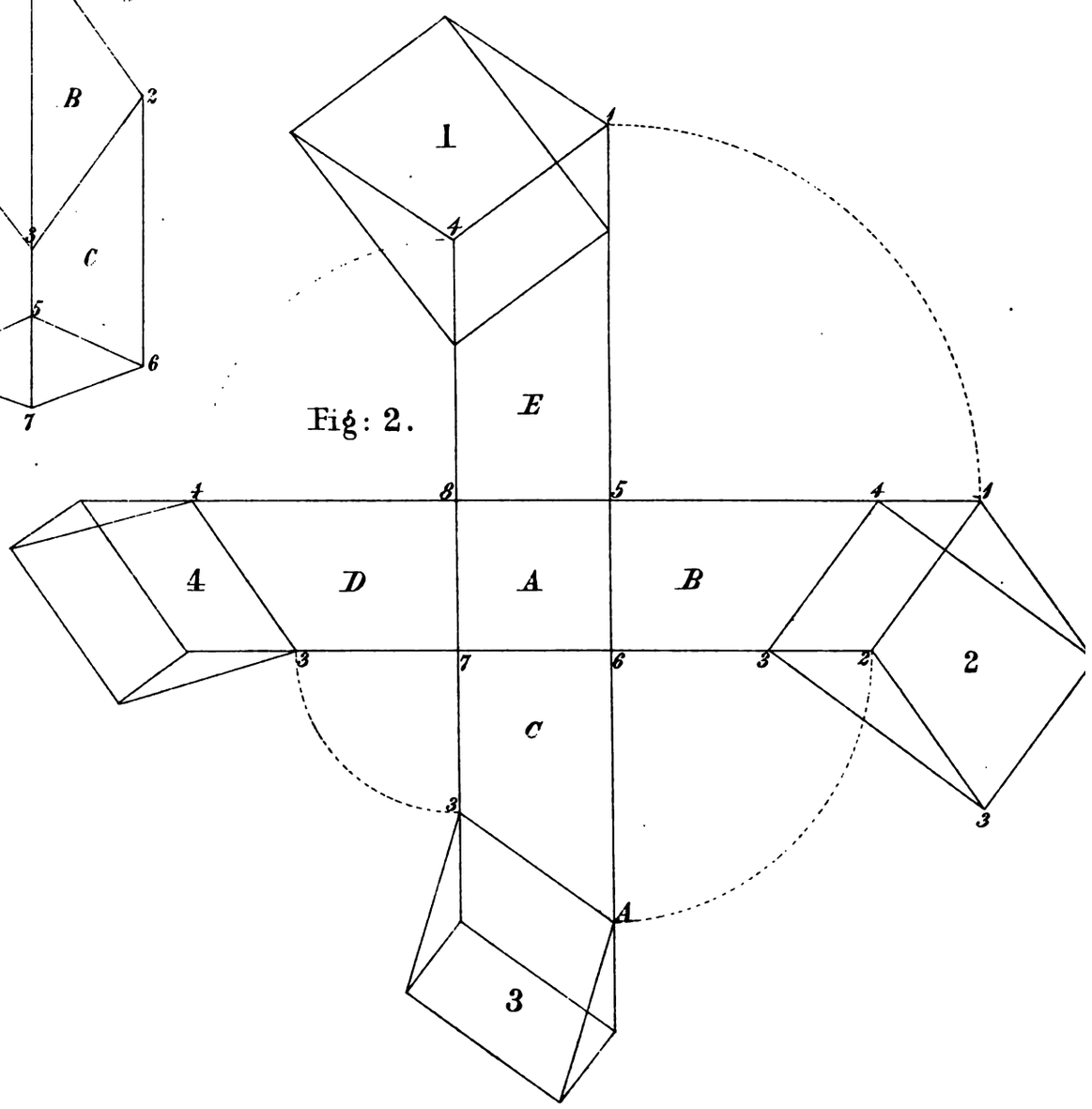

Fig: 2.

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PLATE II.

Represents the Method of obtaining the Section of a Prism.

by MESSRS PILGRIM & RAYNOR.

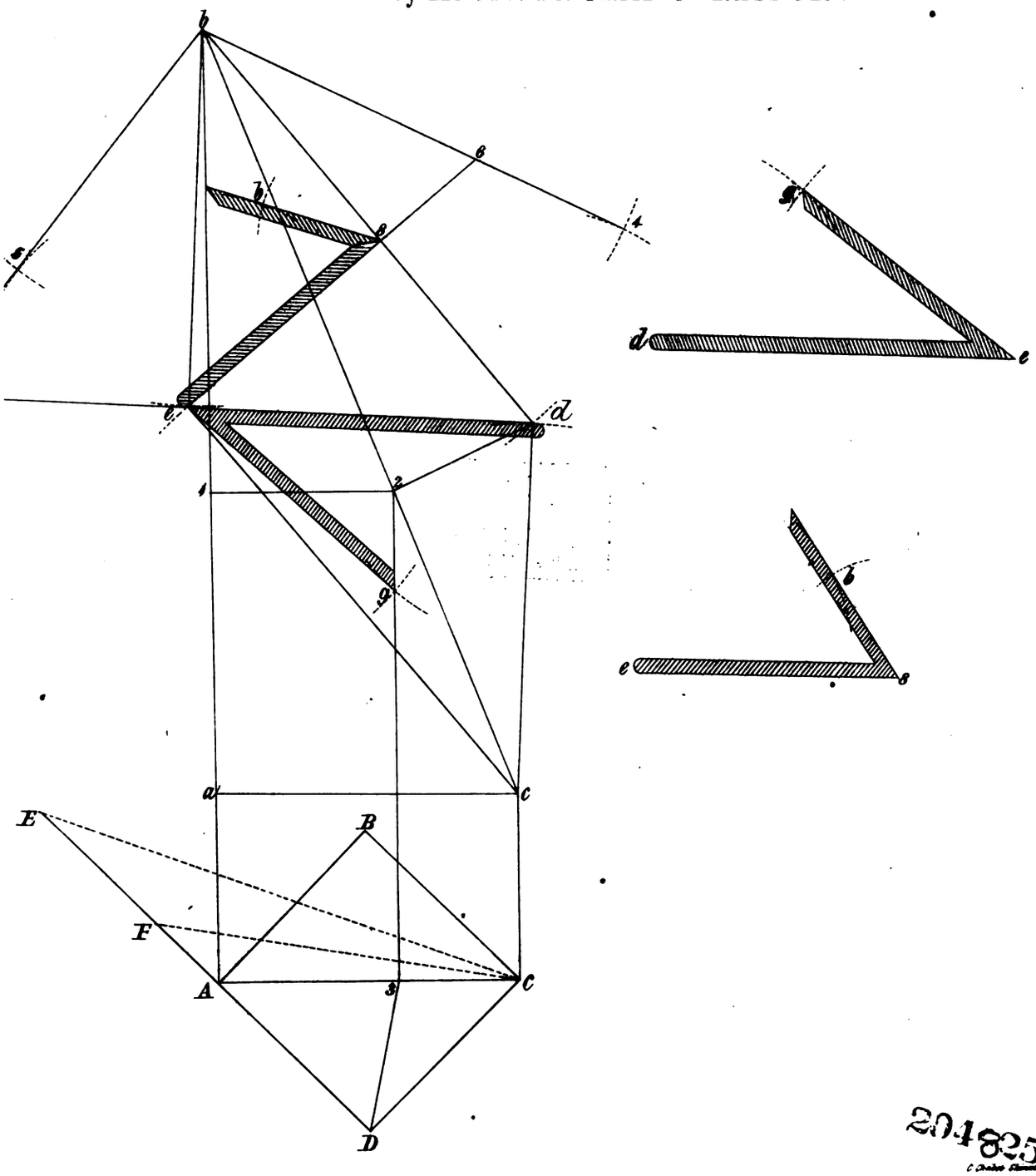

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PLATE III.

Method of getting the Section of a Shaft, by

MESSRS. PILGRIM & RAYNOR.

Teachers of Geometry Mathematics &c.

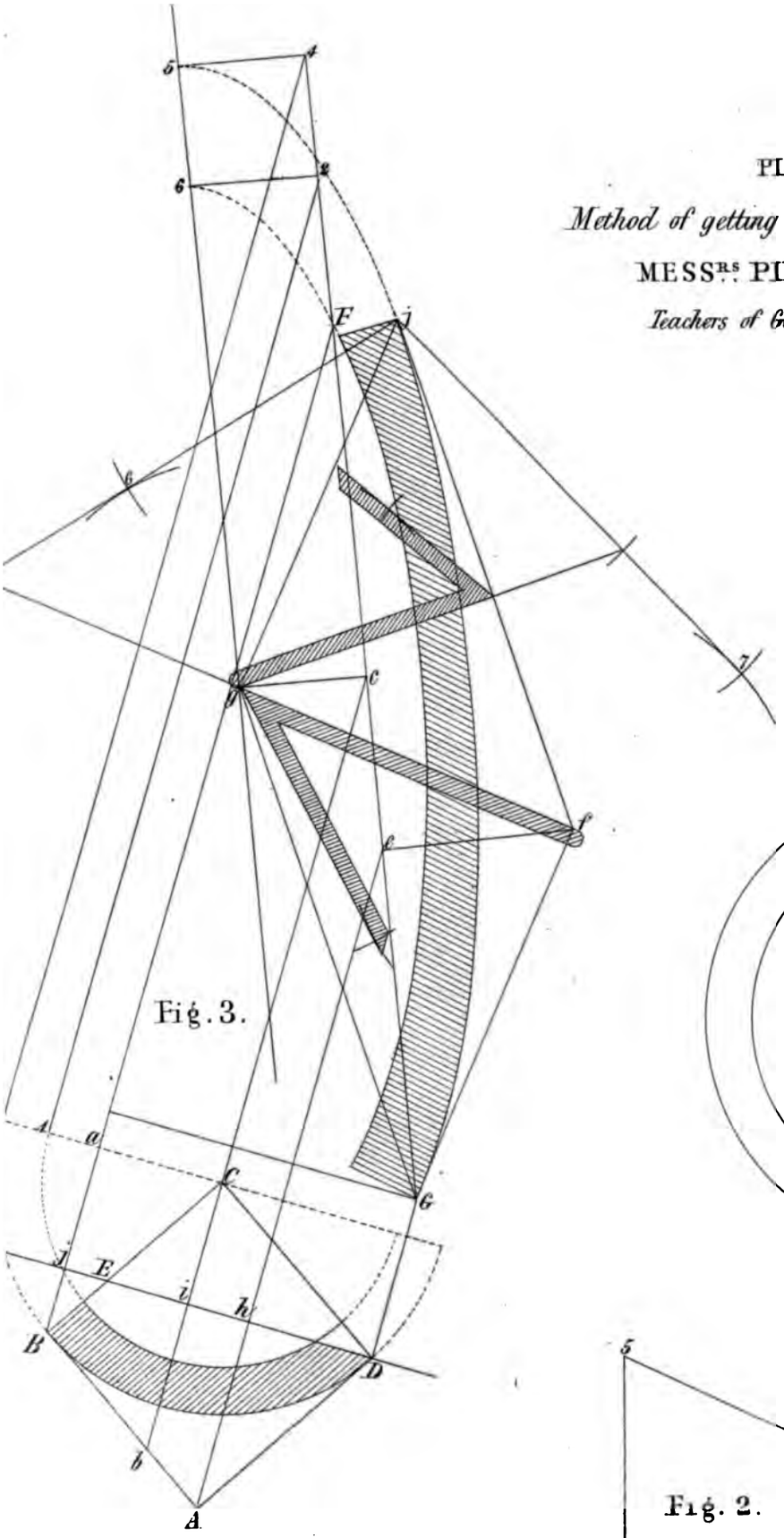

Fig. 3.

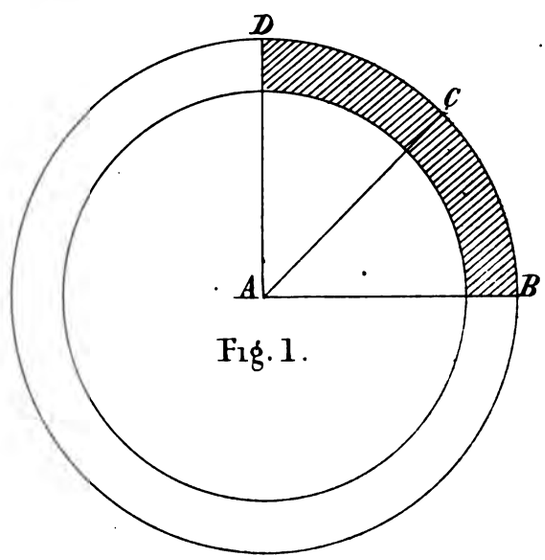

Fig. 1.

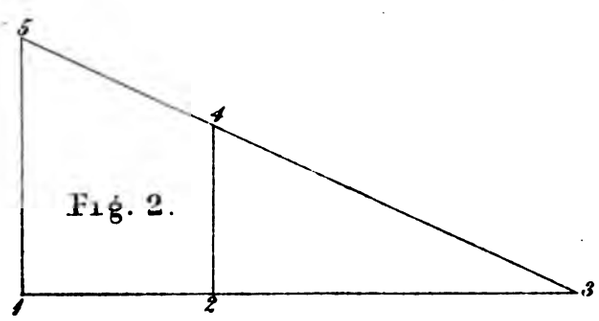

Fig. 2.

[illegible]

SECTION OF SOLIDS.

Presented by Mr. PILGRIM

Teacher of Geometry. 3, Swinton Street Grays Inn Road

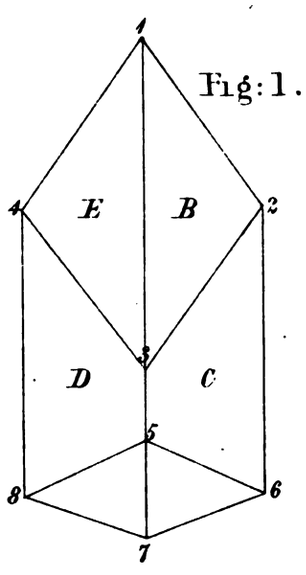

Fig: 1.

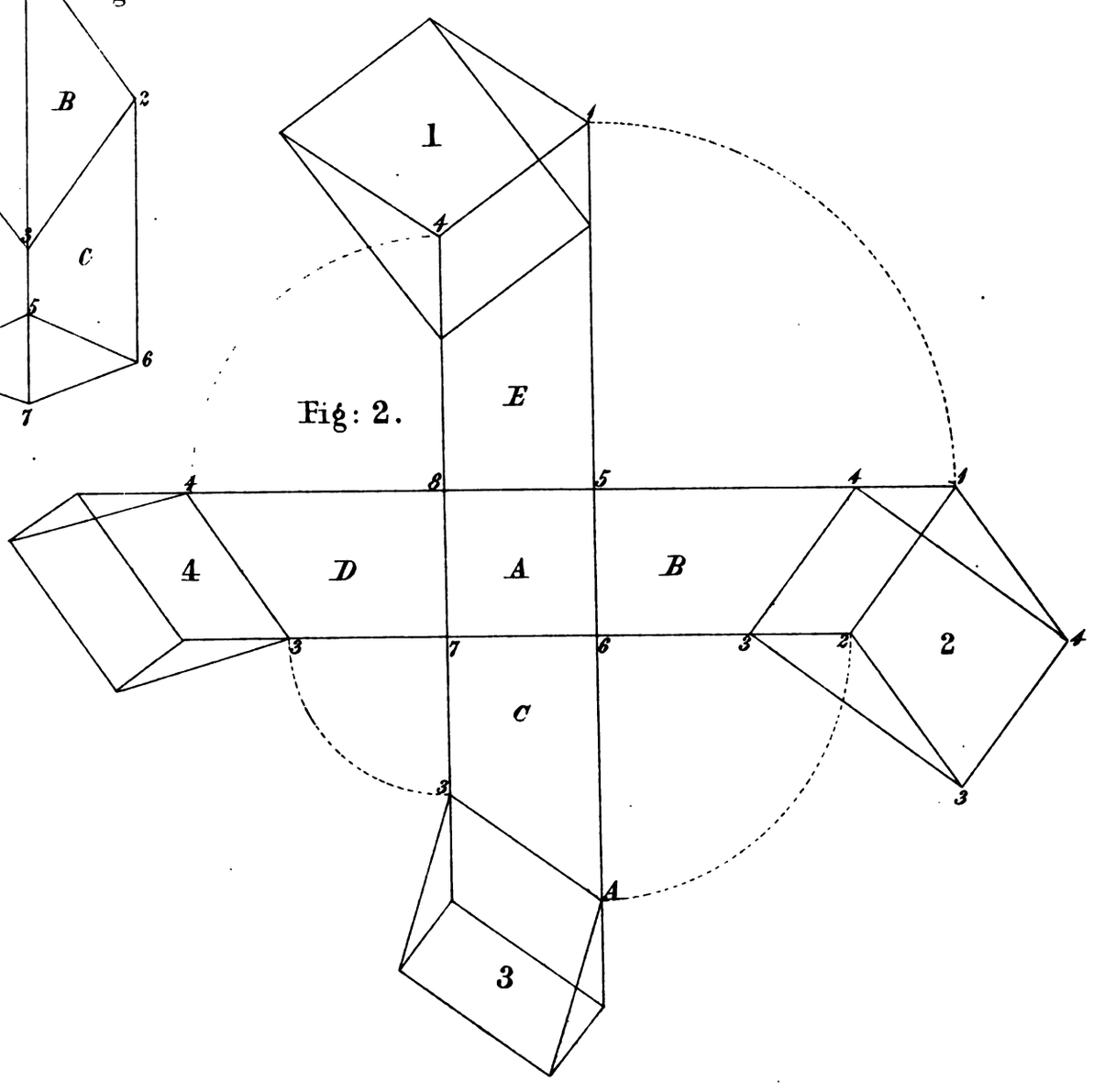

Fig: 2.

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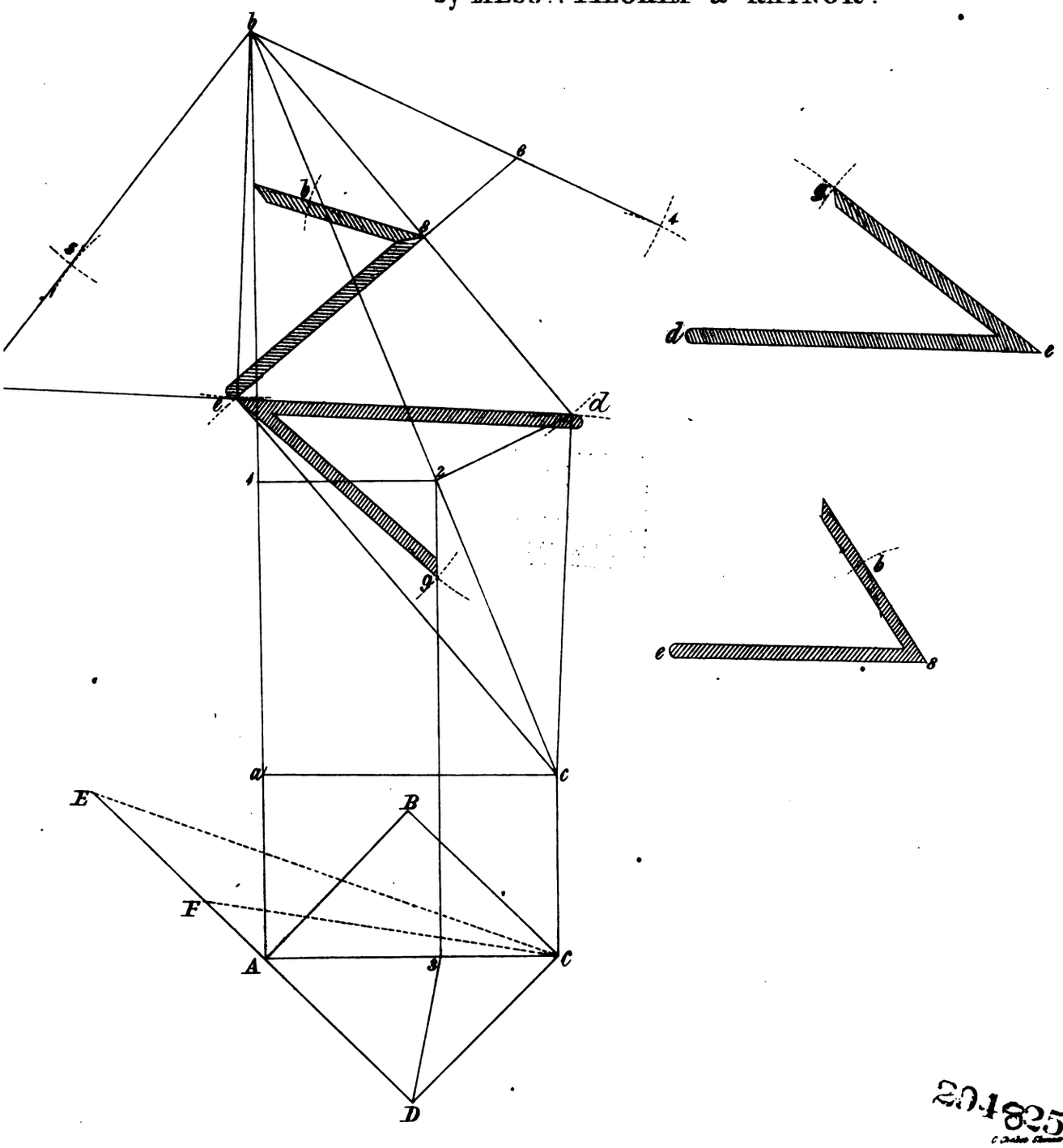
PUBLIC LIBRARY

ASTOR, LENOX
TILDEN FOUNDATIONS

PLATE II.

Represents the Method of obtaining the Section of a Prism.

by MESSRS PILGRIM & RAYNOR.



201825A

PLATE III.

Method of getting the Section of a Shaft, by

MESSRS. PILGRIM & RAYNOR.

Teachers of Geometry Mathematics &c.

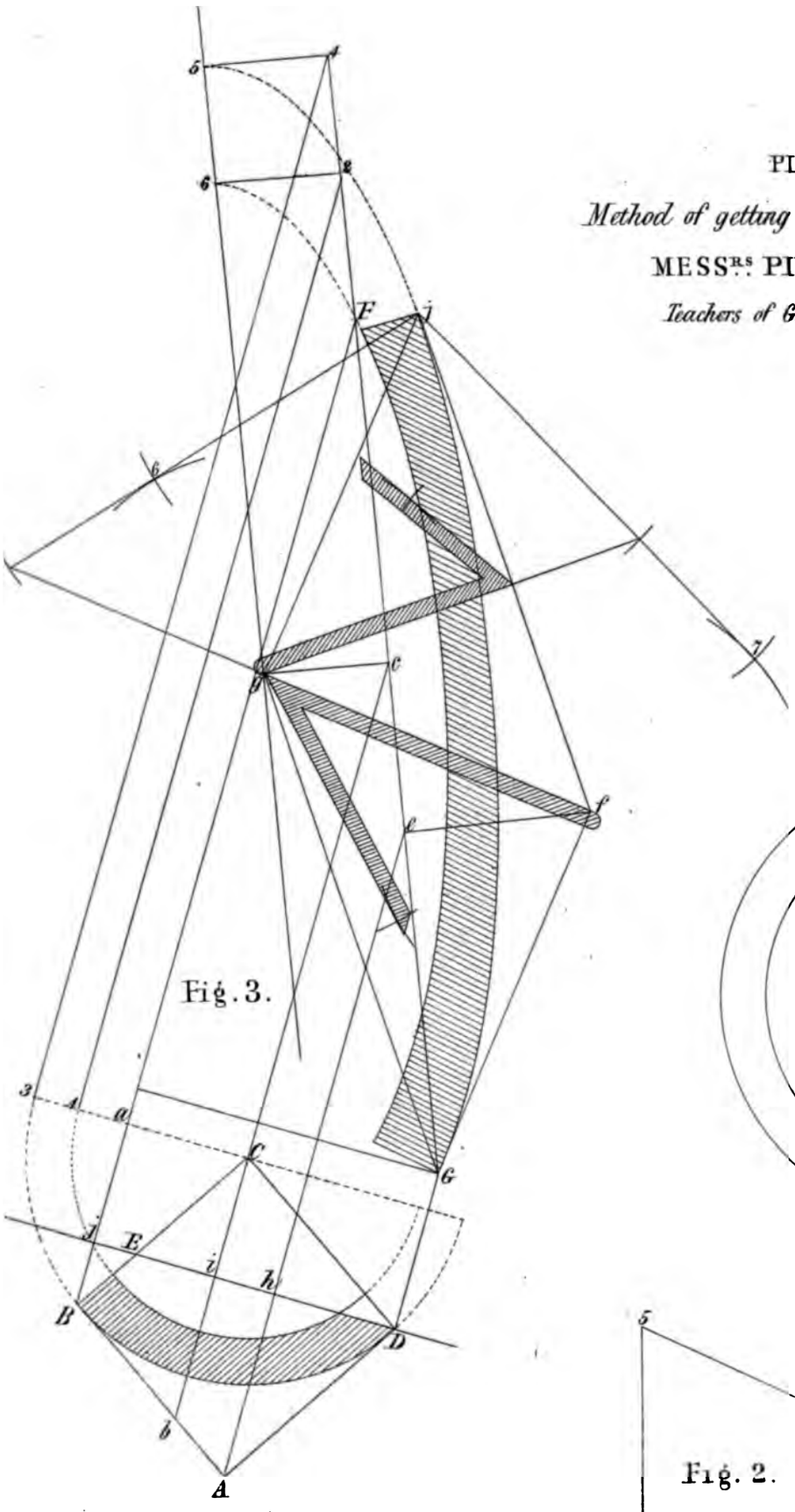


Fig. 3.

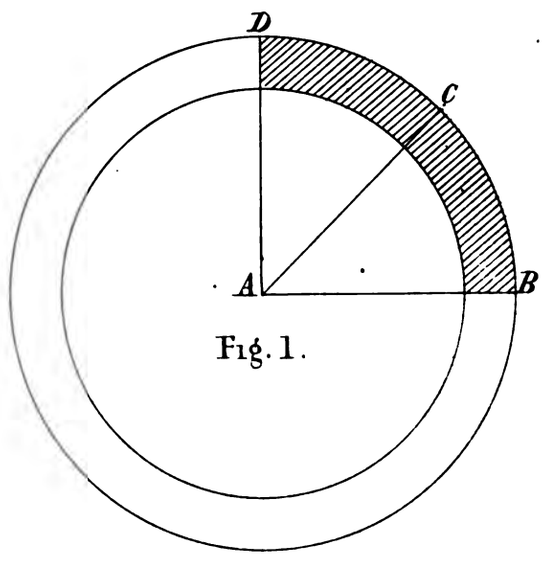


Fig. 1.

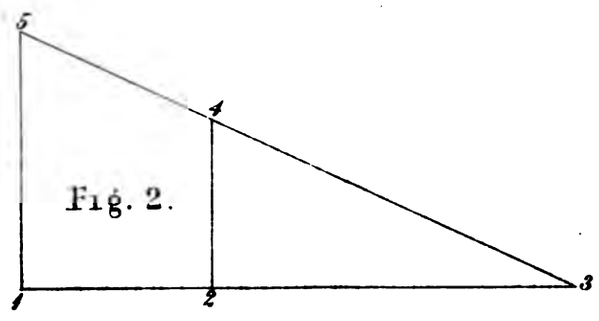


Fig. 2.

PLATE VI.

Presented by Mr. CLARK.

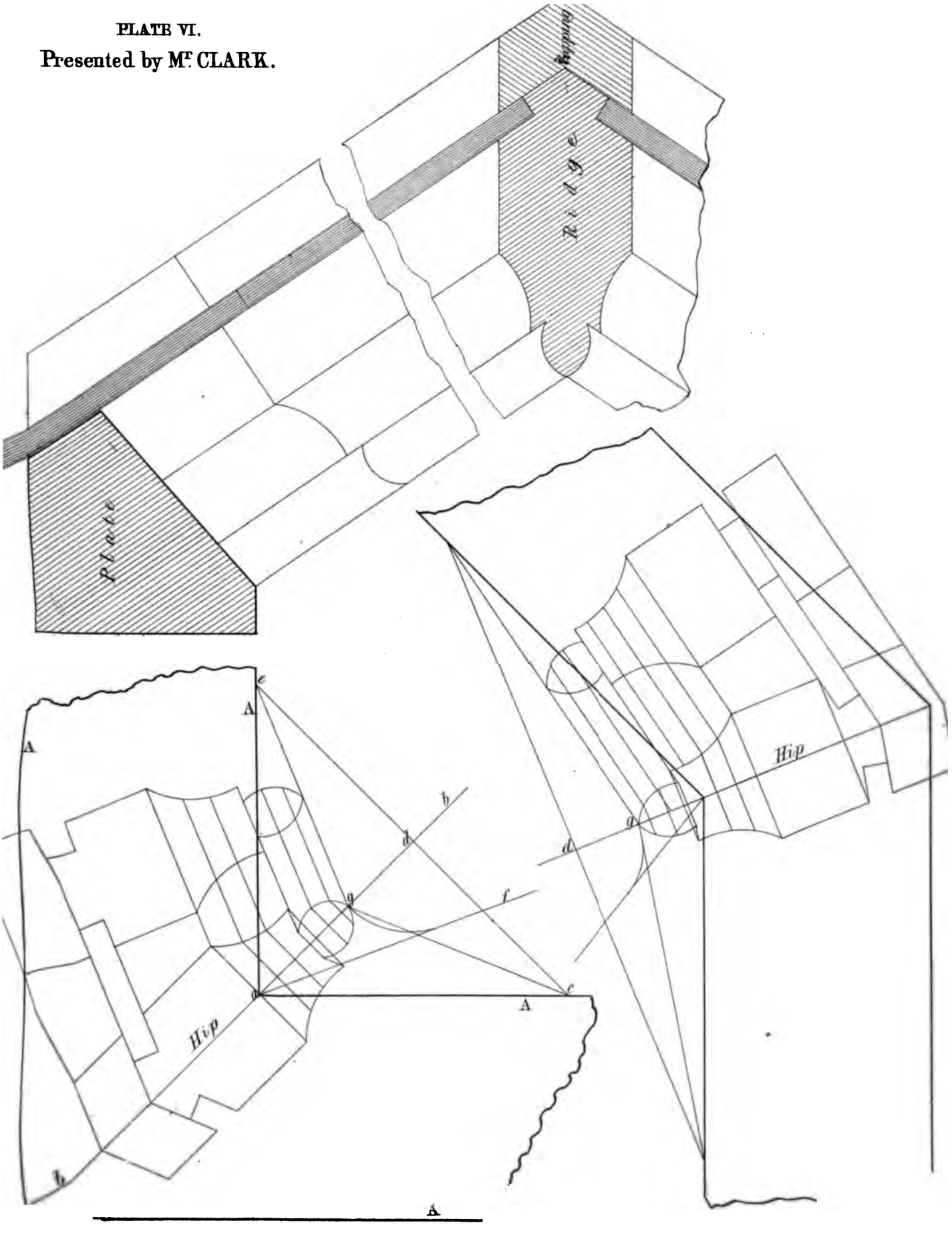
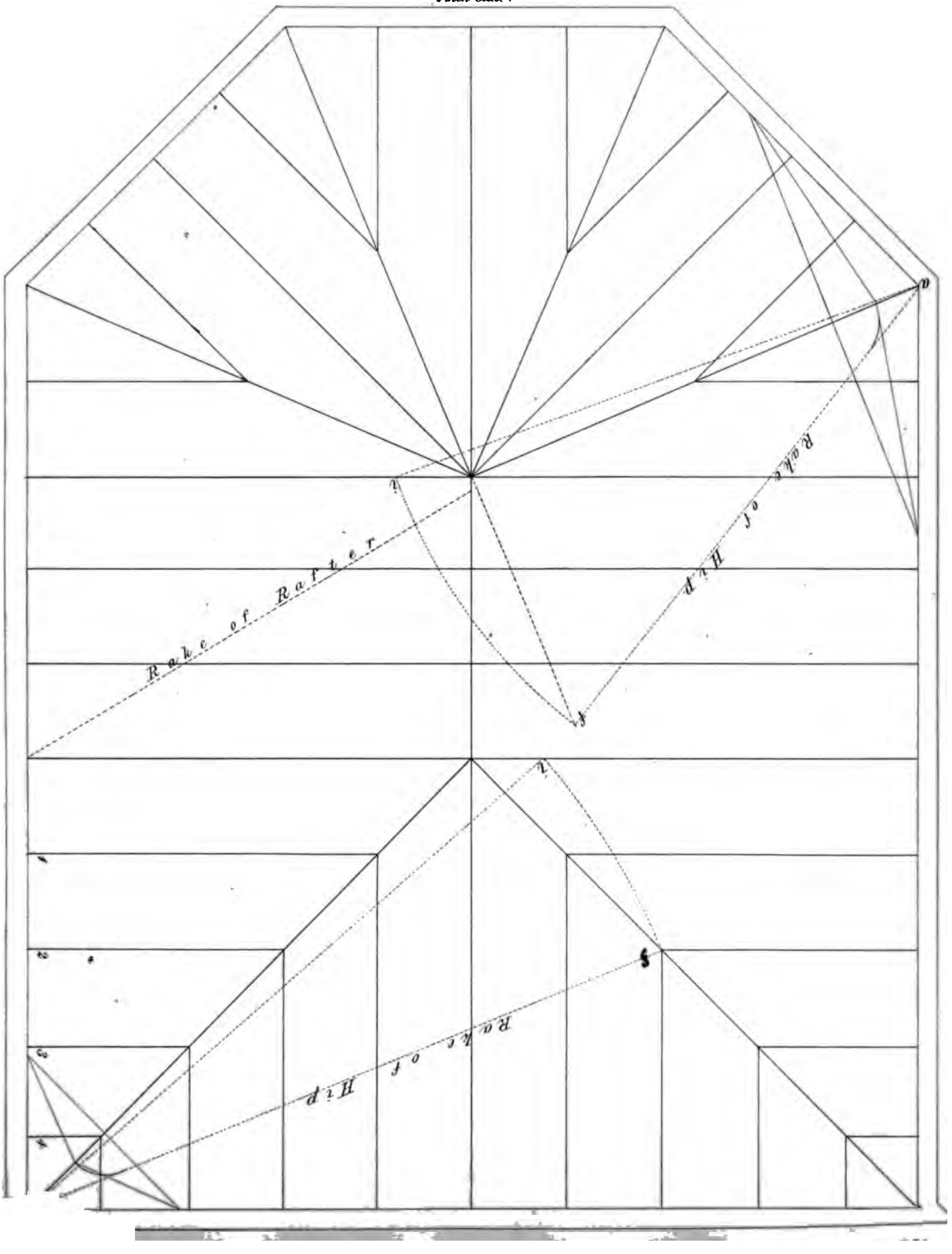


PLATE V.

PLAN OF ROOF

Presented by Mr. Wm. CLARK.

1 inch Scale.



A method of getting the Mitres for splayed Mouldings of any character, by
MESSRS. PILGRIM & RAYNOR.

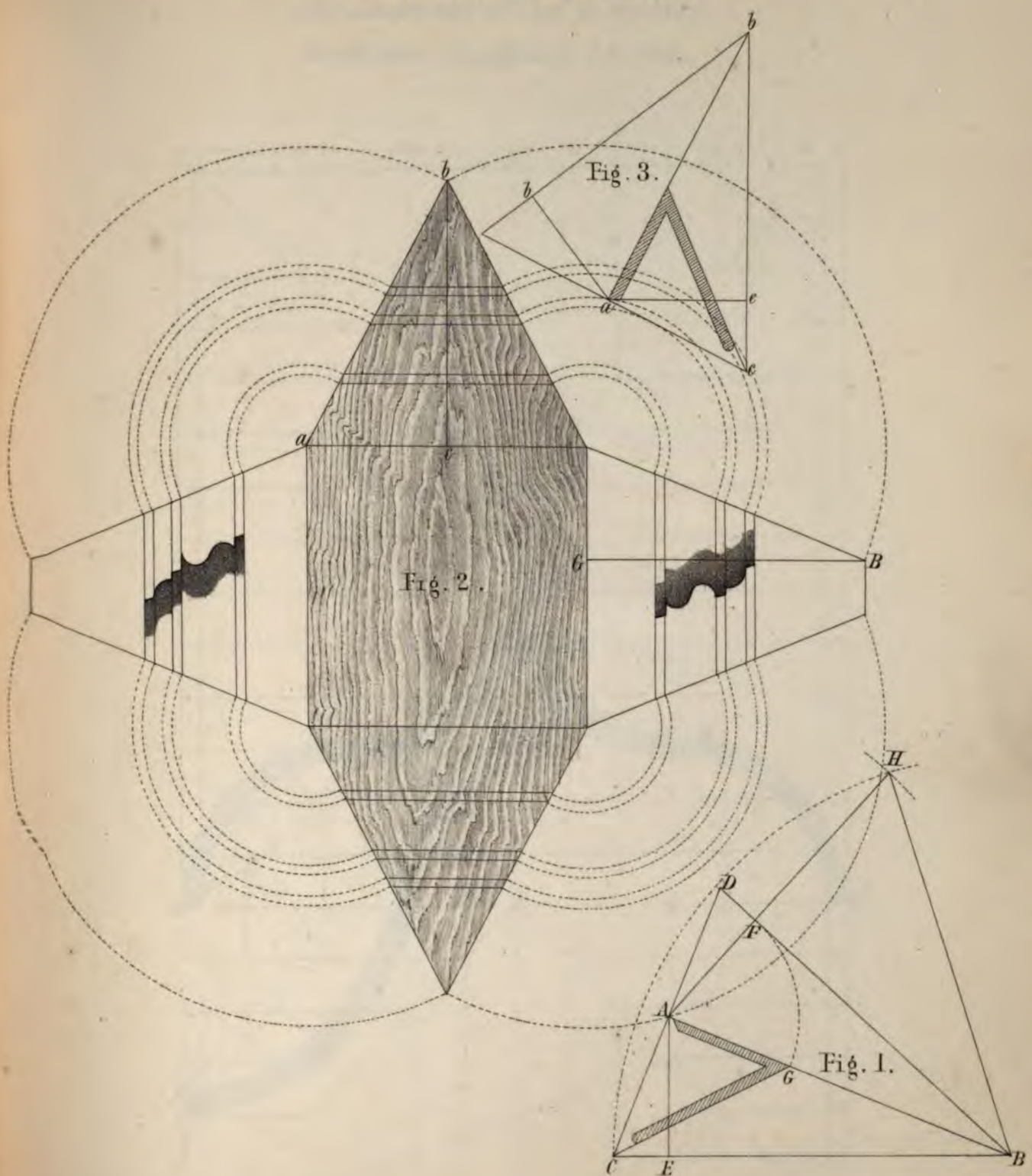
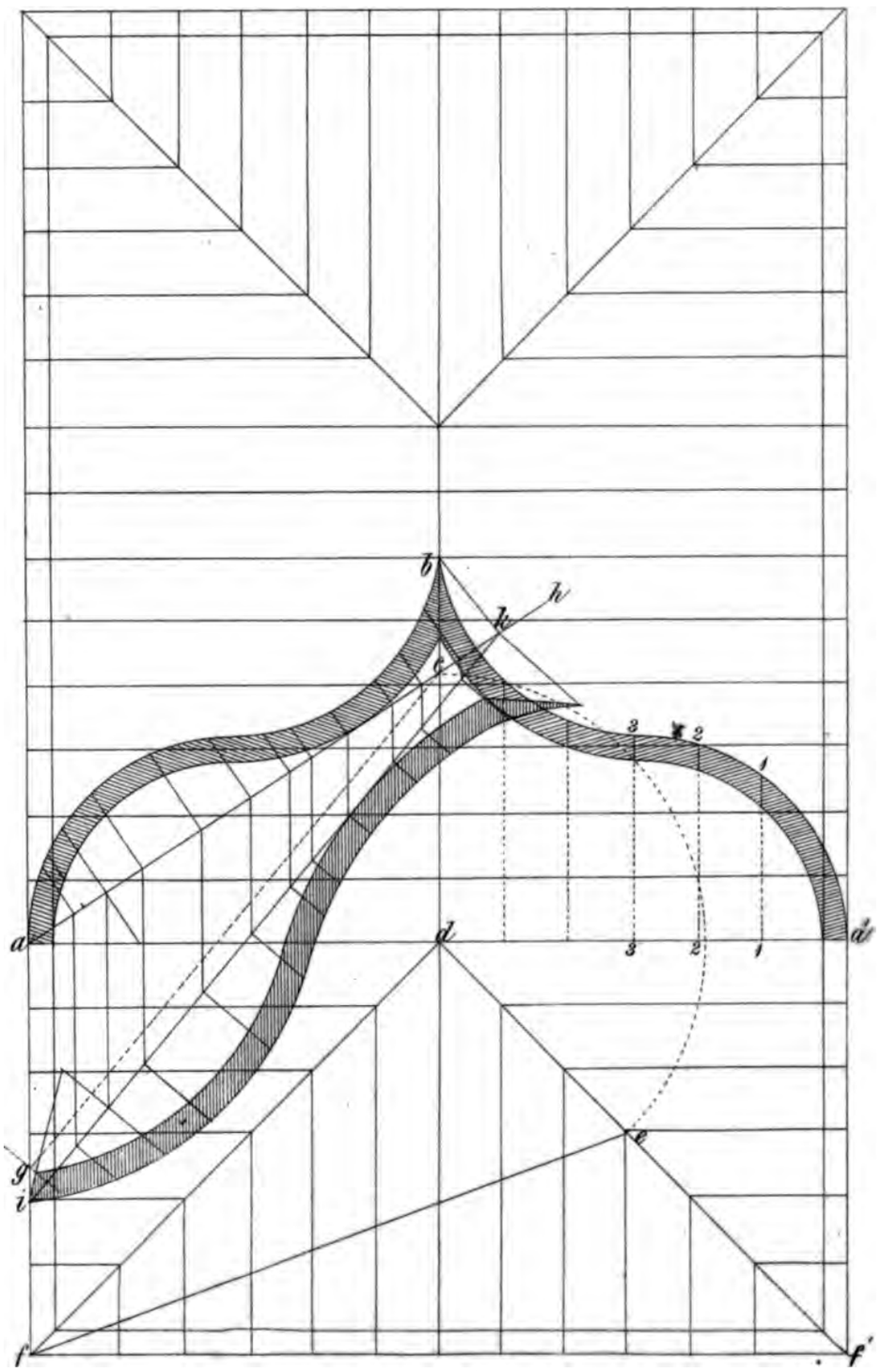


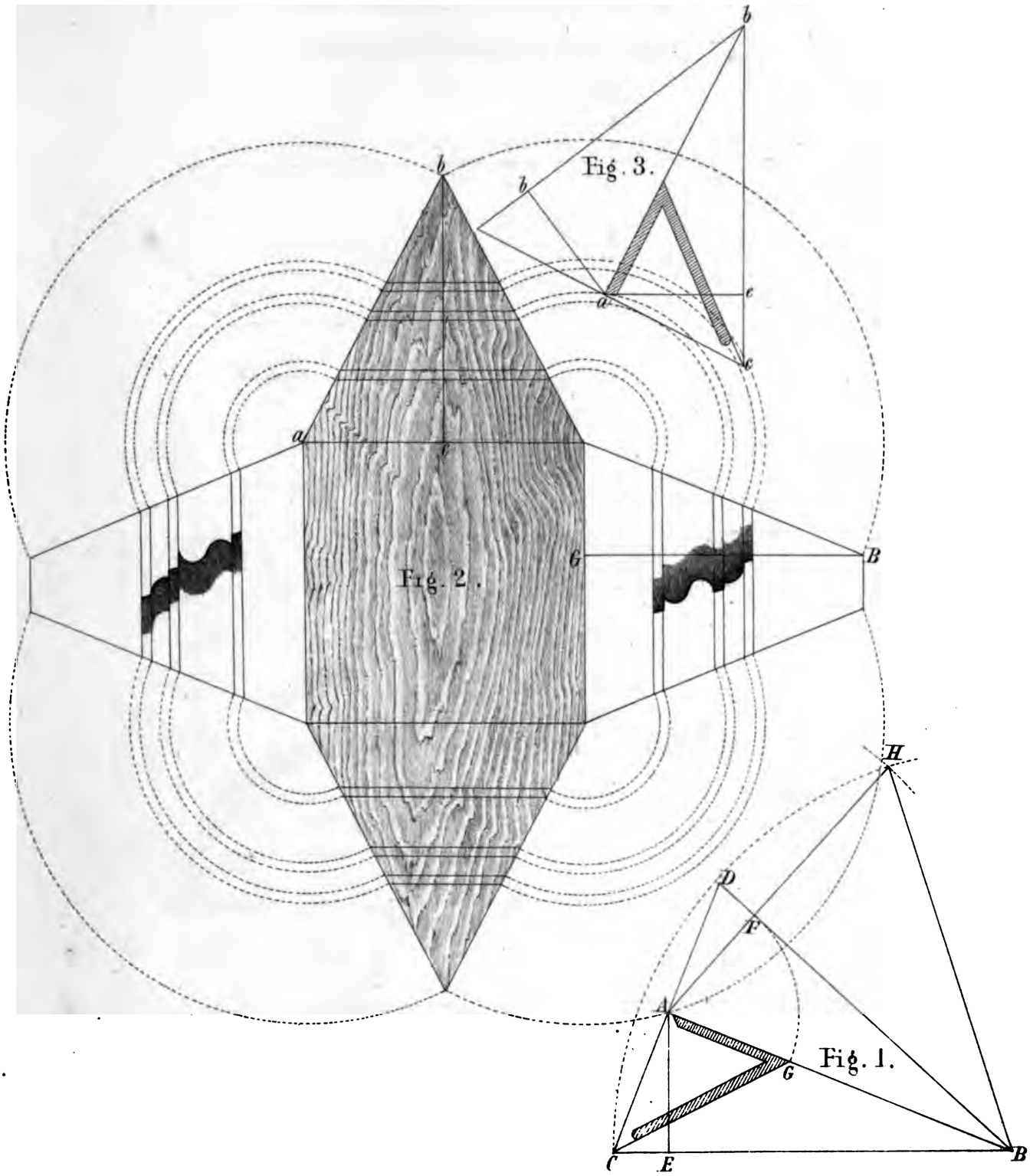
PLATE IX.

Plan of a Roof for a Verandah also applicable to any other construction of Roof or Sky-light.

by MESSRS PILGRIM & RAYNOR.



A method of getting the Mitres for splayed Mouldings of any character, by
MESSRS. PILGRIM & RAYNOR.



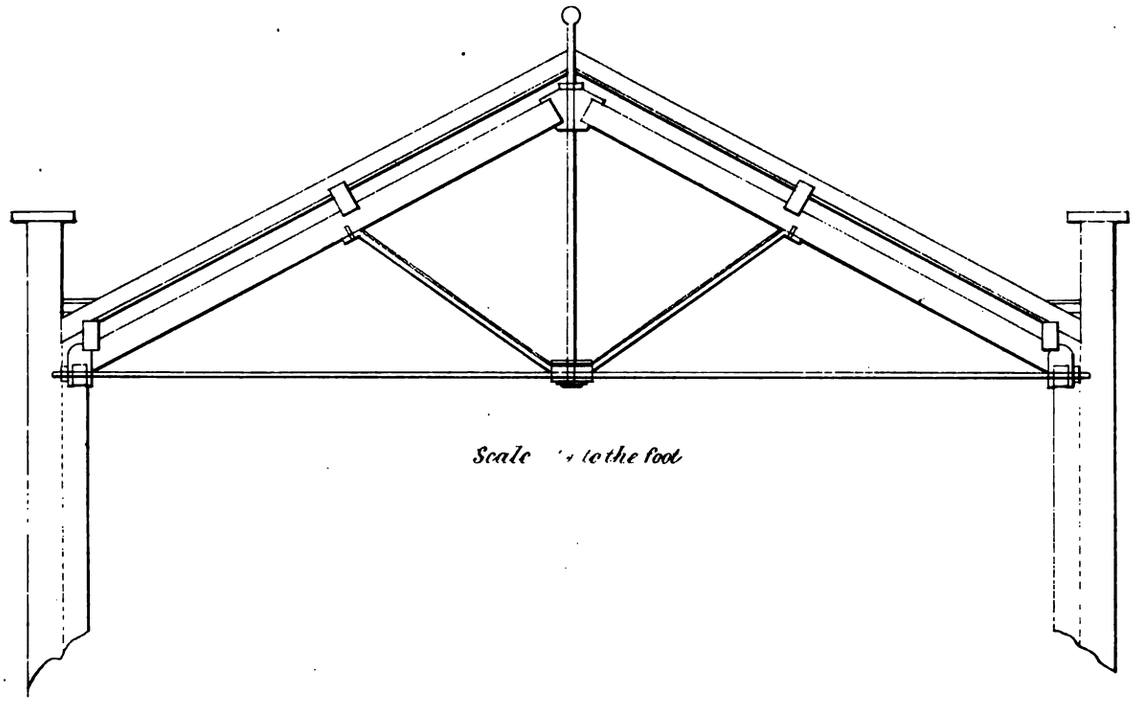
[illegible]

LATE XI

Shewing Plan of a naked Roof for a School, or any other Room where Ceilings are not introduced.

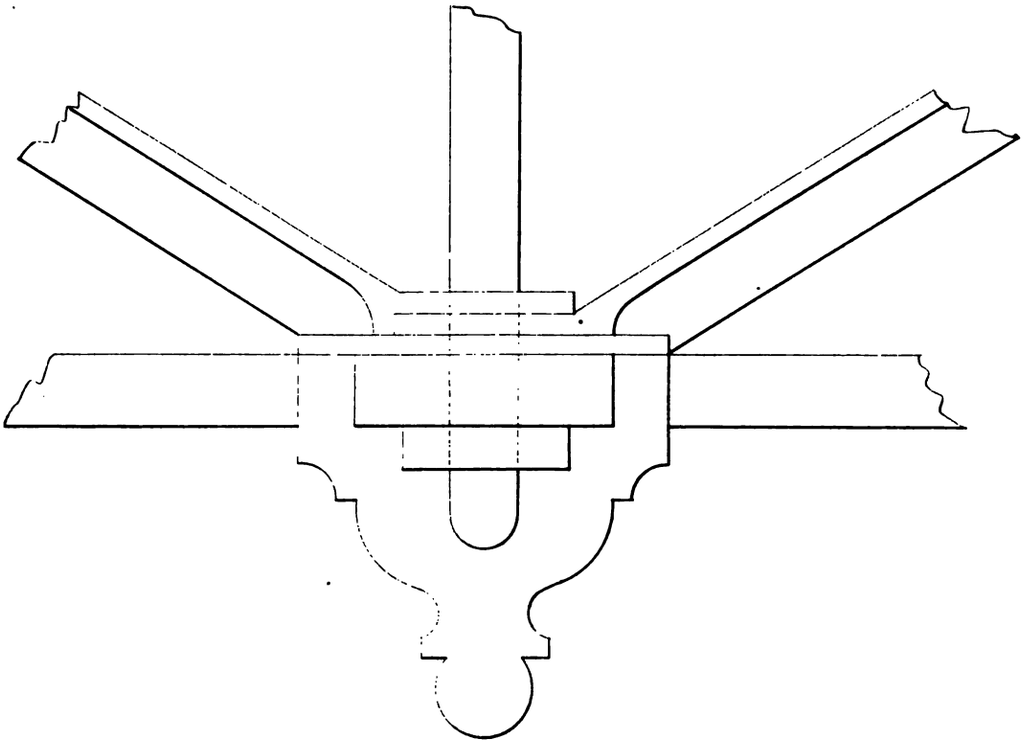
Presented by

Mr. PARSONS. *of Trinity St. Islington.*



Section of Straps & Bolt.

¼ full size.



C. Chabot Jun. Skinner Sc.

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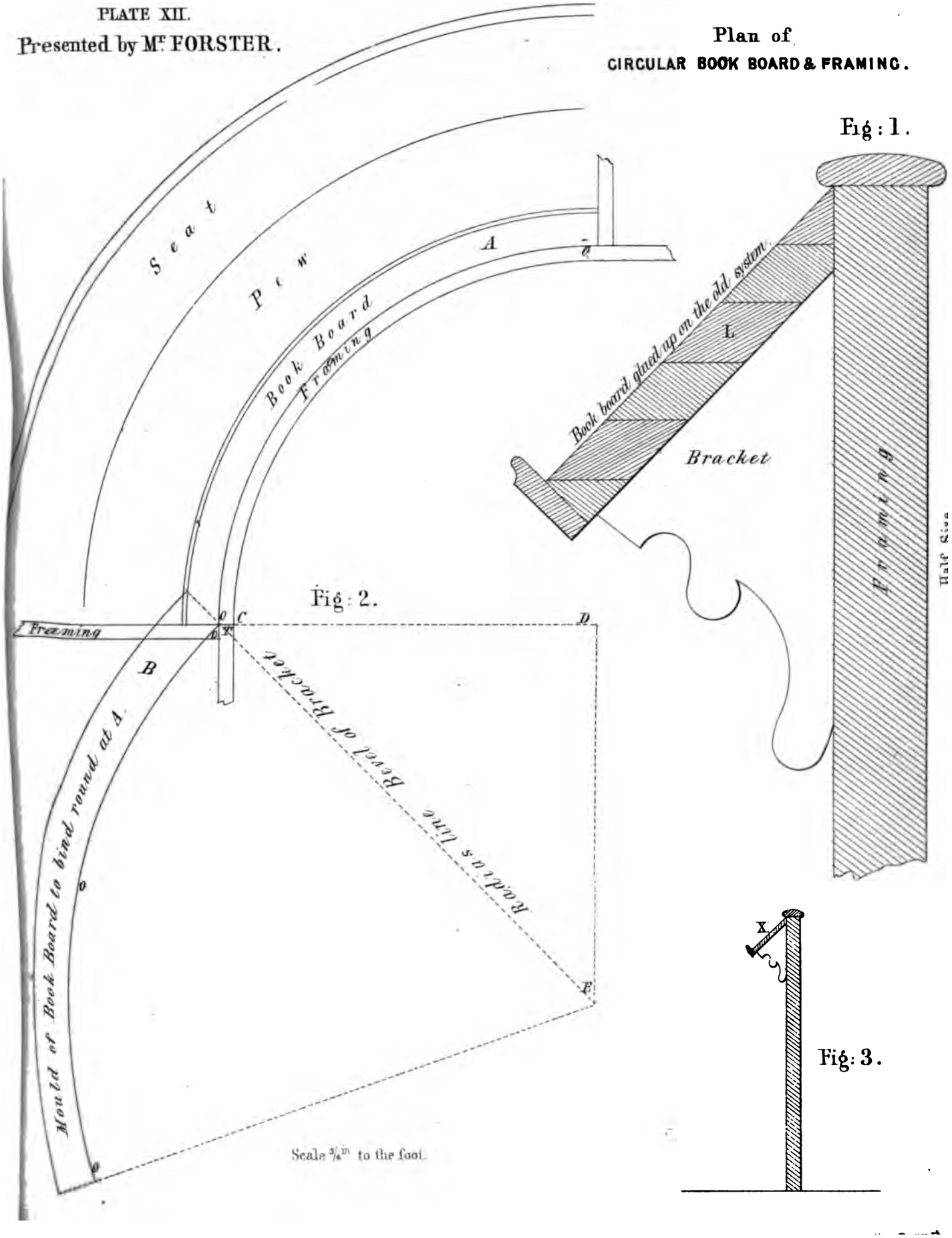
ASTOR, LENOX
TILDEN FOUNDATIONS

PLATE XII.

Presented by Mr. FORSTER.

Plan of CIRCULAR BOOK BOARD & FRAMING.



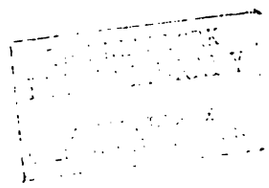


PLATE XIII.

Elevation Section & Plan.

OF A

PAIR OF GOTHIC DOORS.

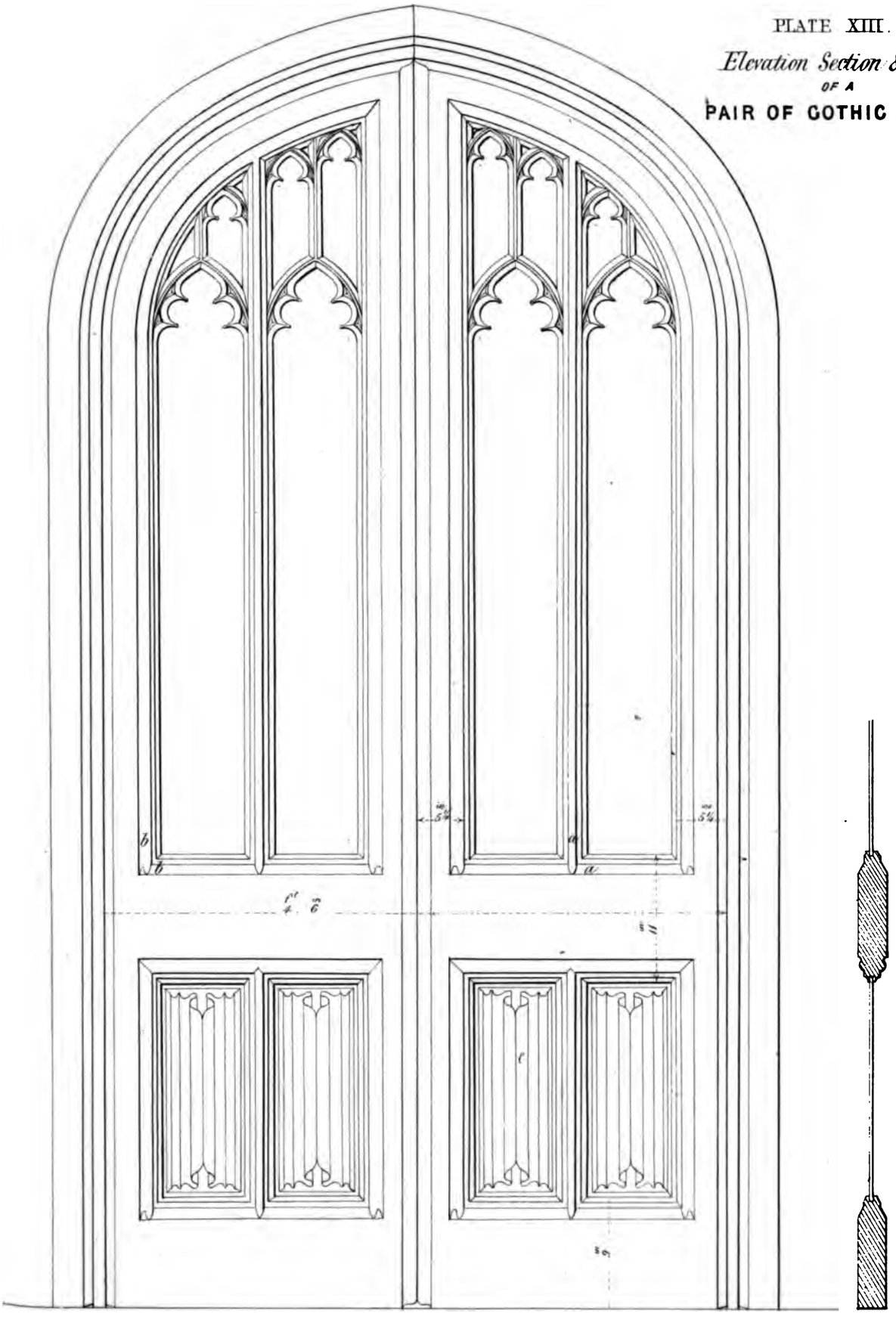
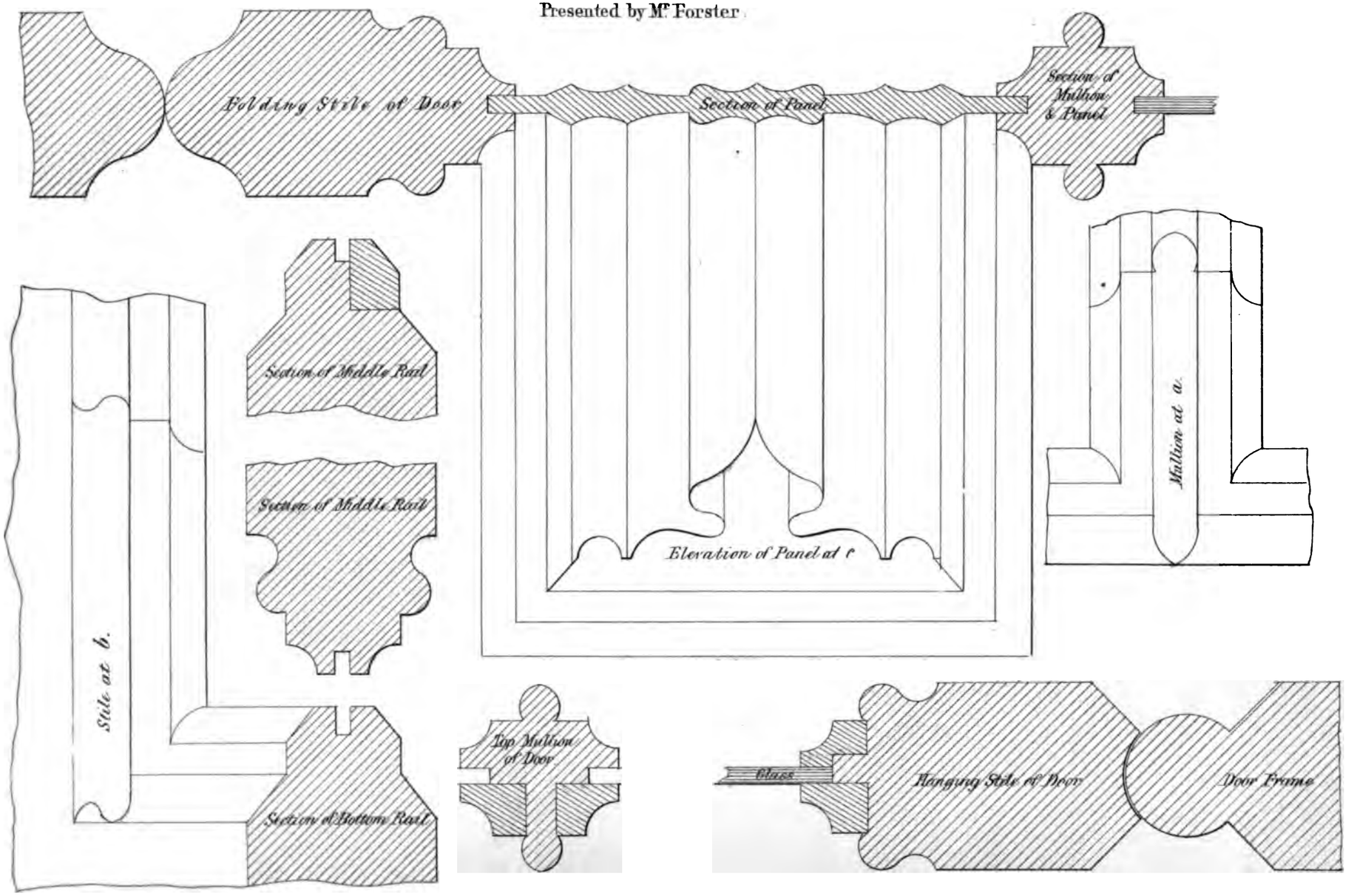


PLATE XIV.

DETAILS OF GOTHIC FOLDING DOORS

as shewn in Plate 13.

Presented by Mr. Forster.



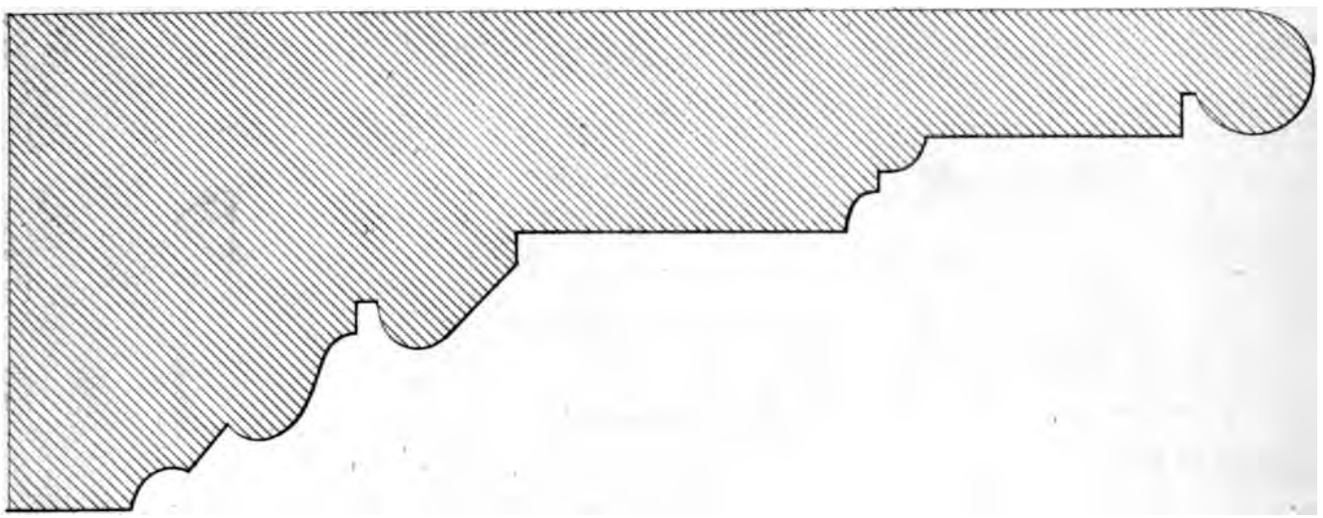
Scale ½ Size.

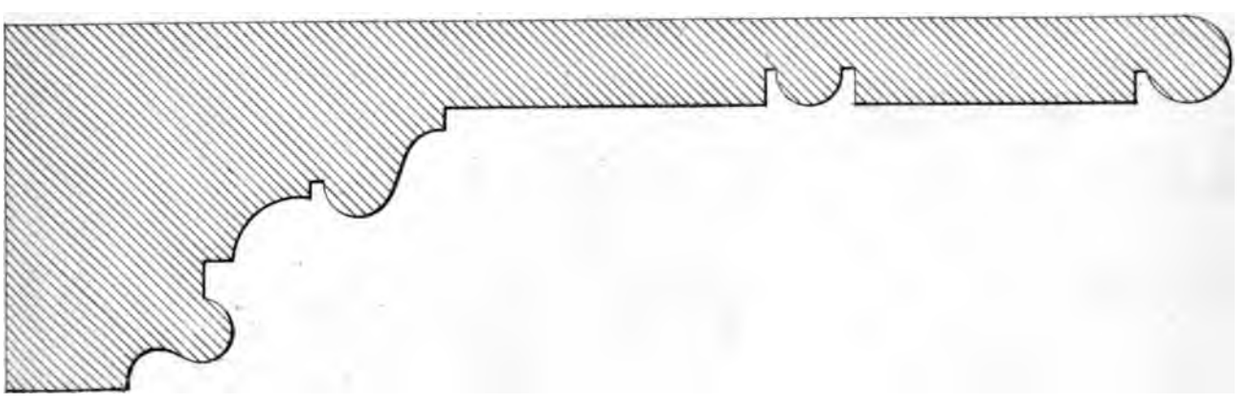
C. Chabot Lith. Skinner St.

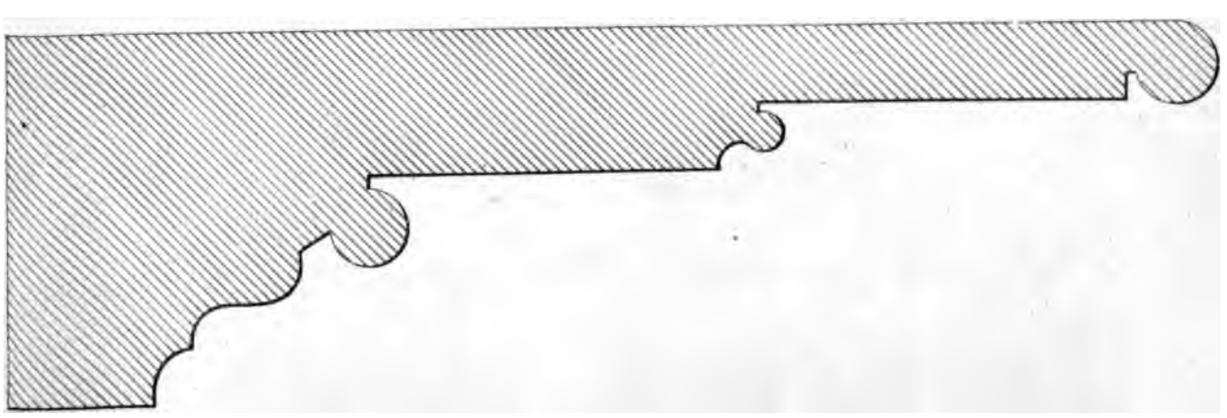
PLATE XV.

ARCHATRIVES.

As introduced into the New Houses of Parliament.





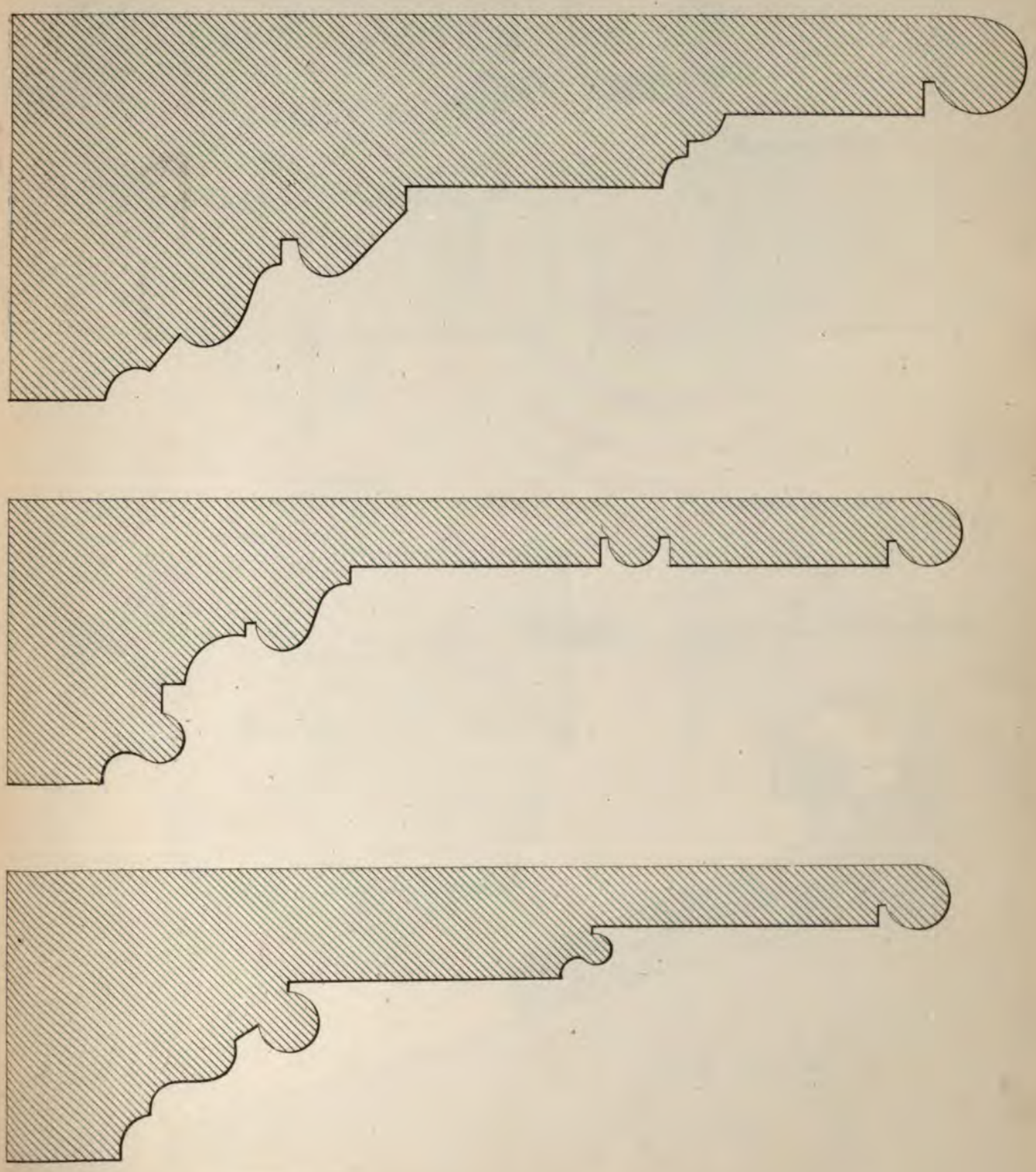


C Chabot Zinco Skinner St.

PLATE XV.

ARCHATRIVES.

As introduced into the New Houses of Parliament.

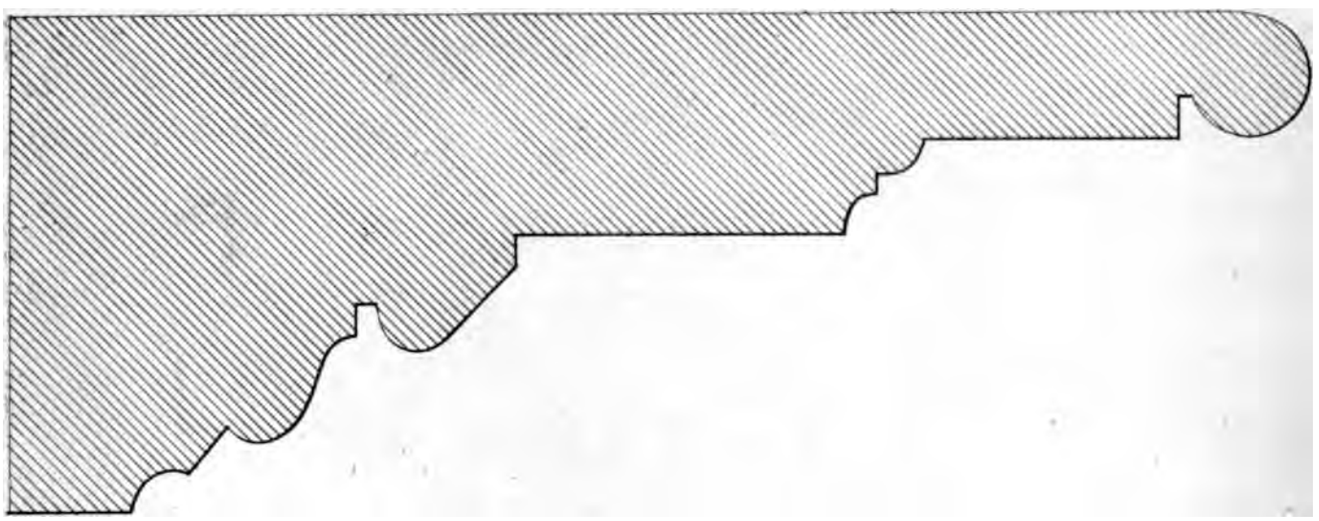


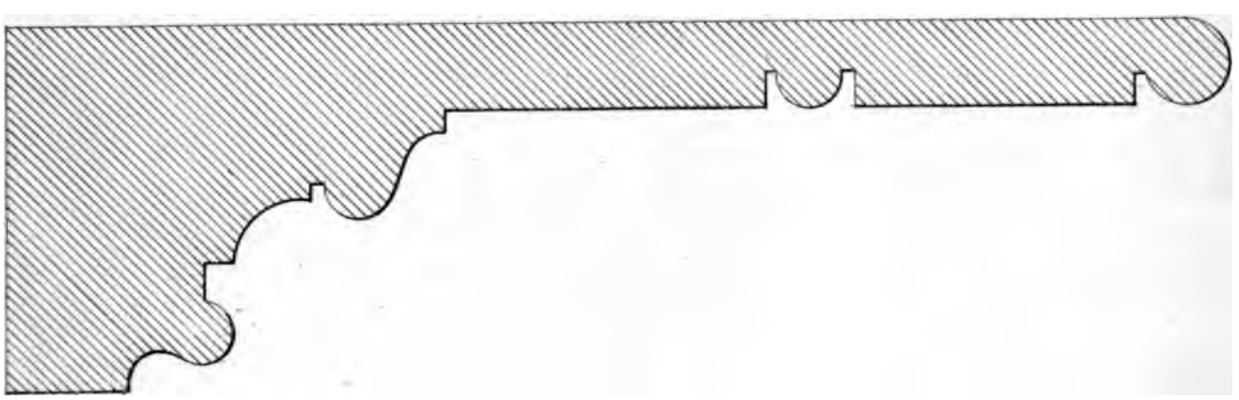
C. Chabot Junior Skinner St.

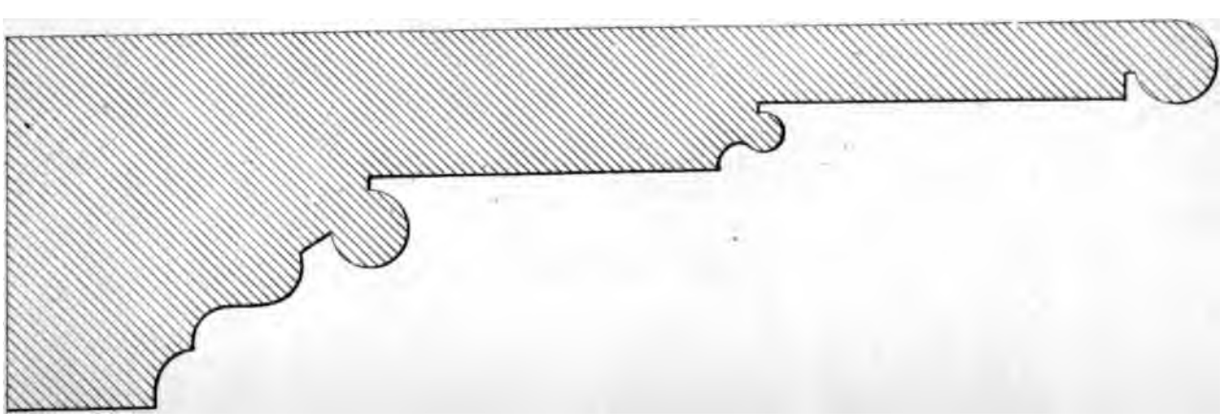
PLATE XV.

ARCHATRIVES.

As introduced into the New Houses of Parliament.





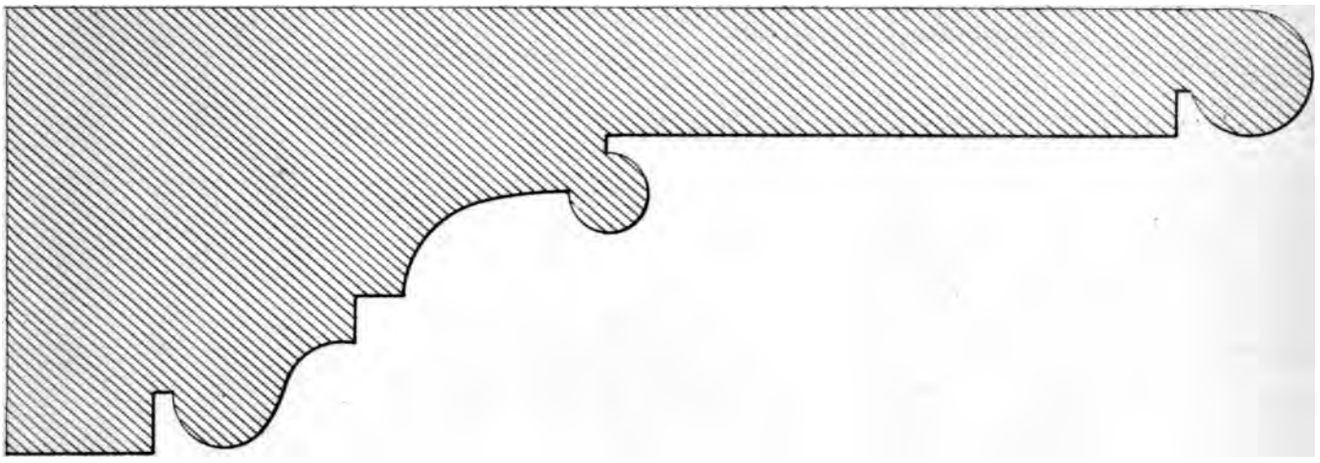


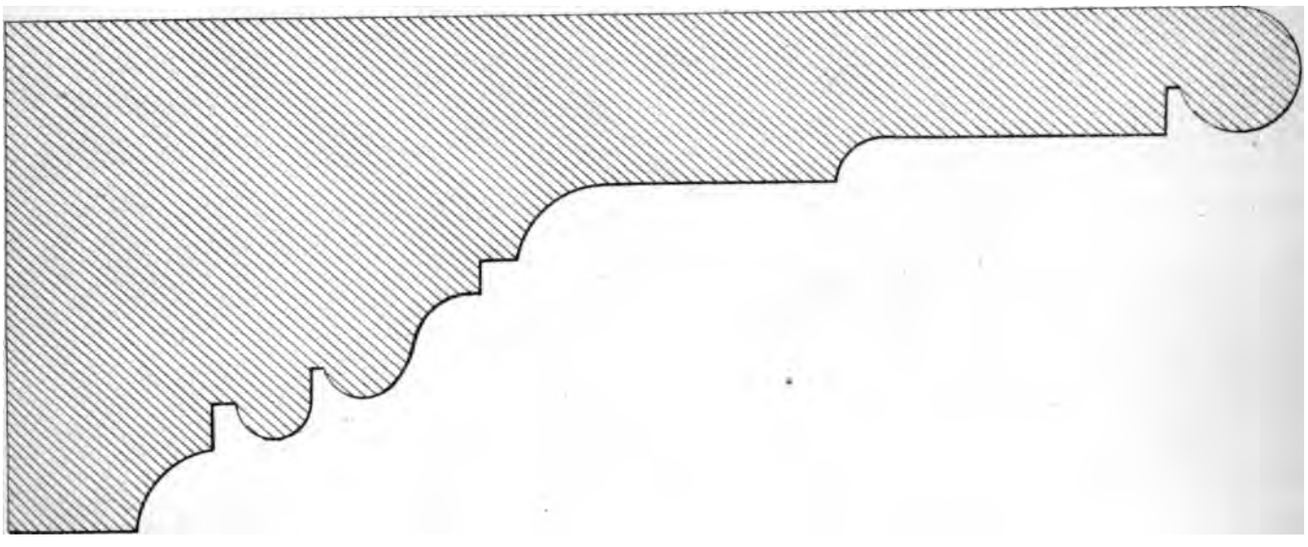
C. Chabot Lincs Skinner

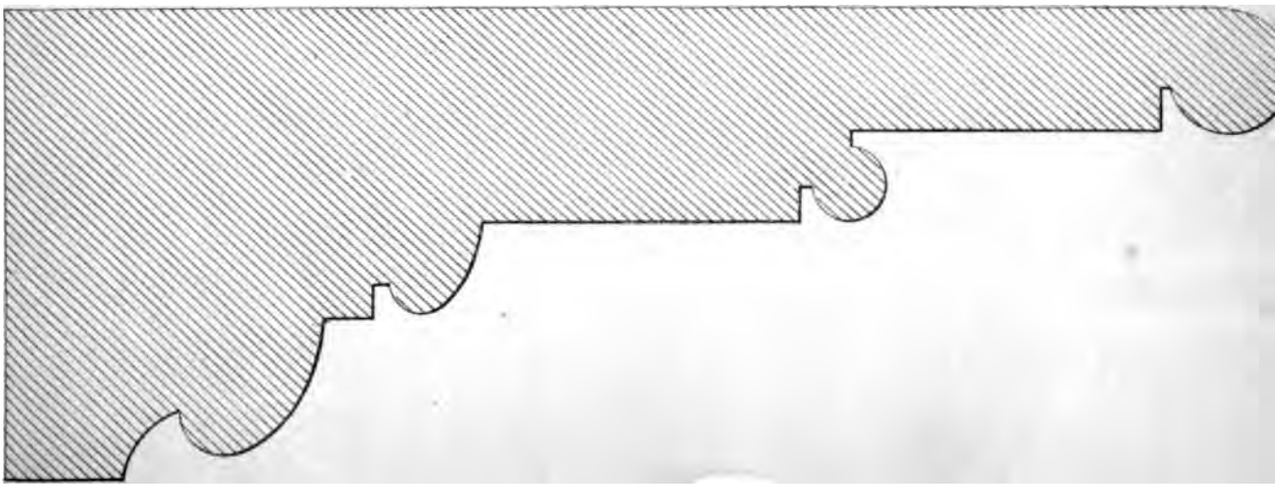
PLATE XVII.

ARCHATRIVES.

As introduced into the New Houses of Parliament.







C. Chalot Lith. Shannon St.

PLATE XX.

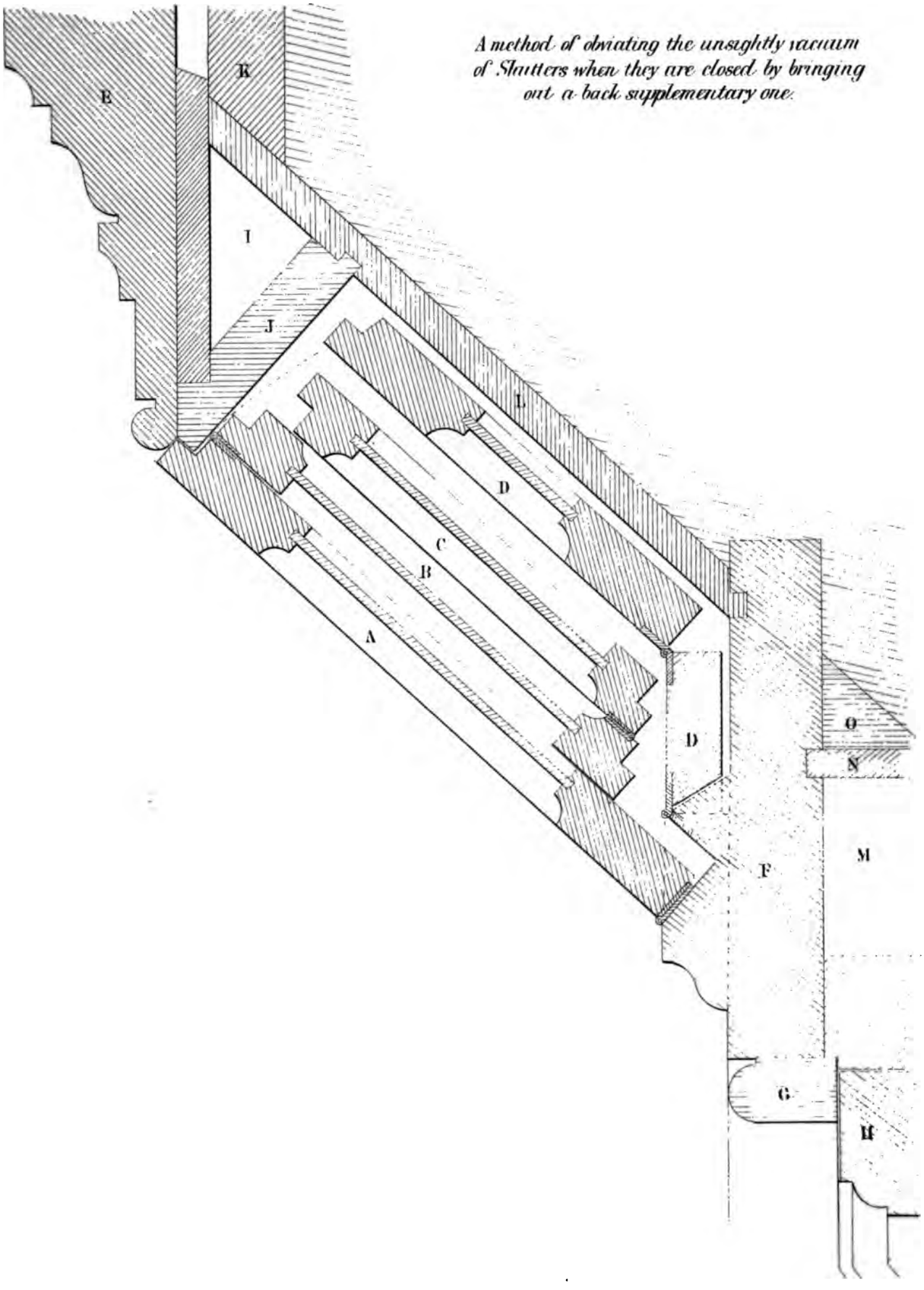
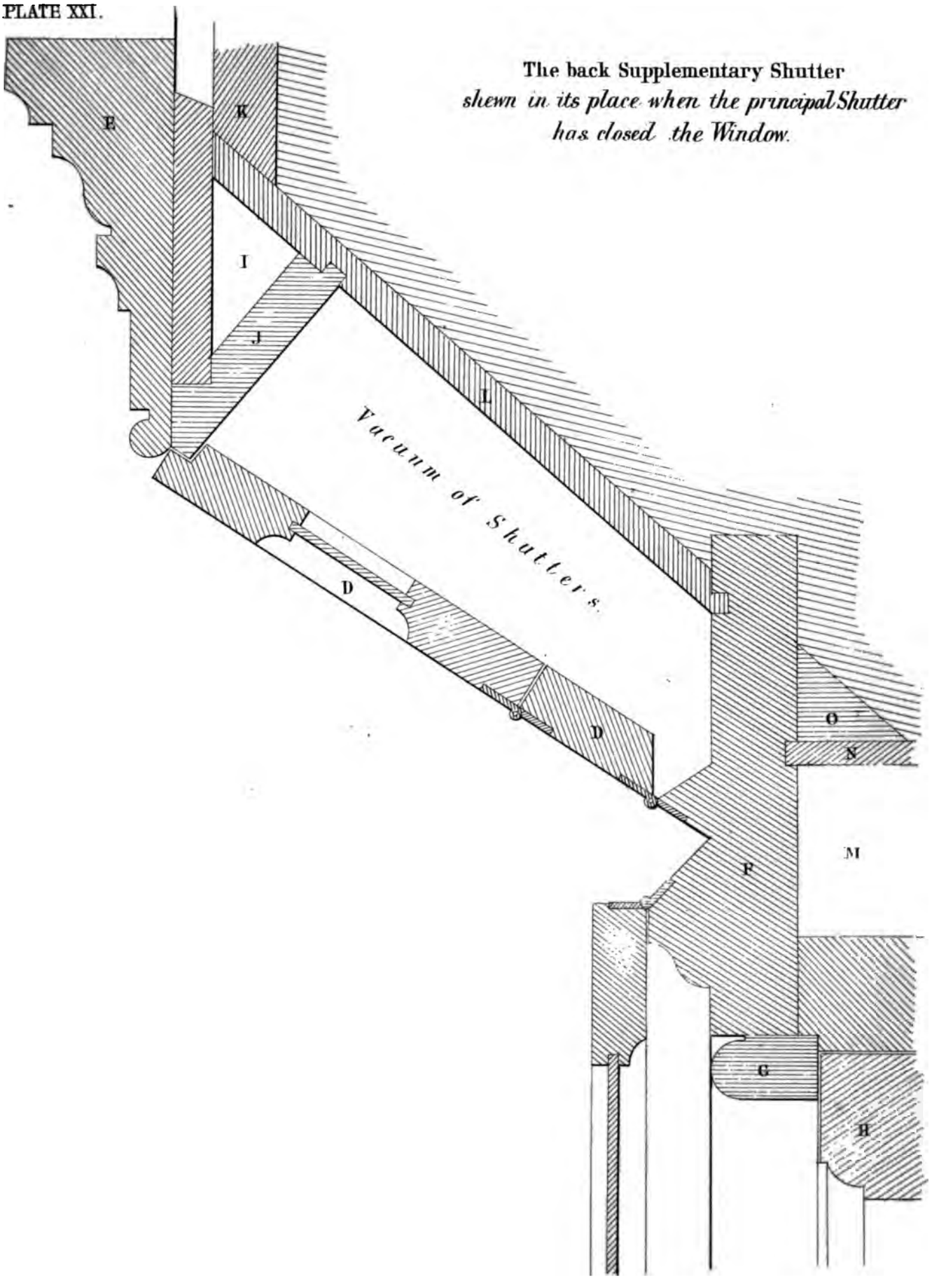

A method of obviating the unsightly vacuum of Shutters when they are closed by bringing out a back supplementary one.
E
K
I
J
L
D
C
B
A
D
O
N
M
F
G
H

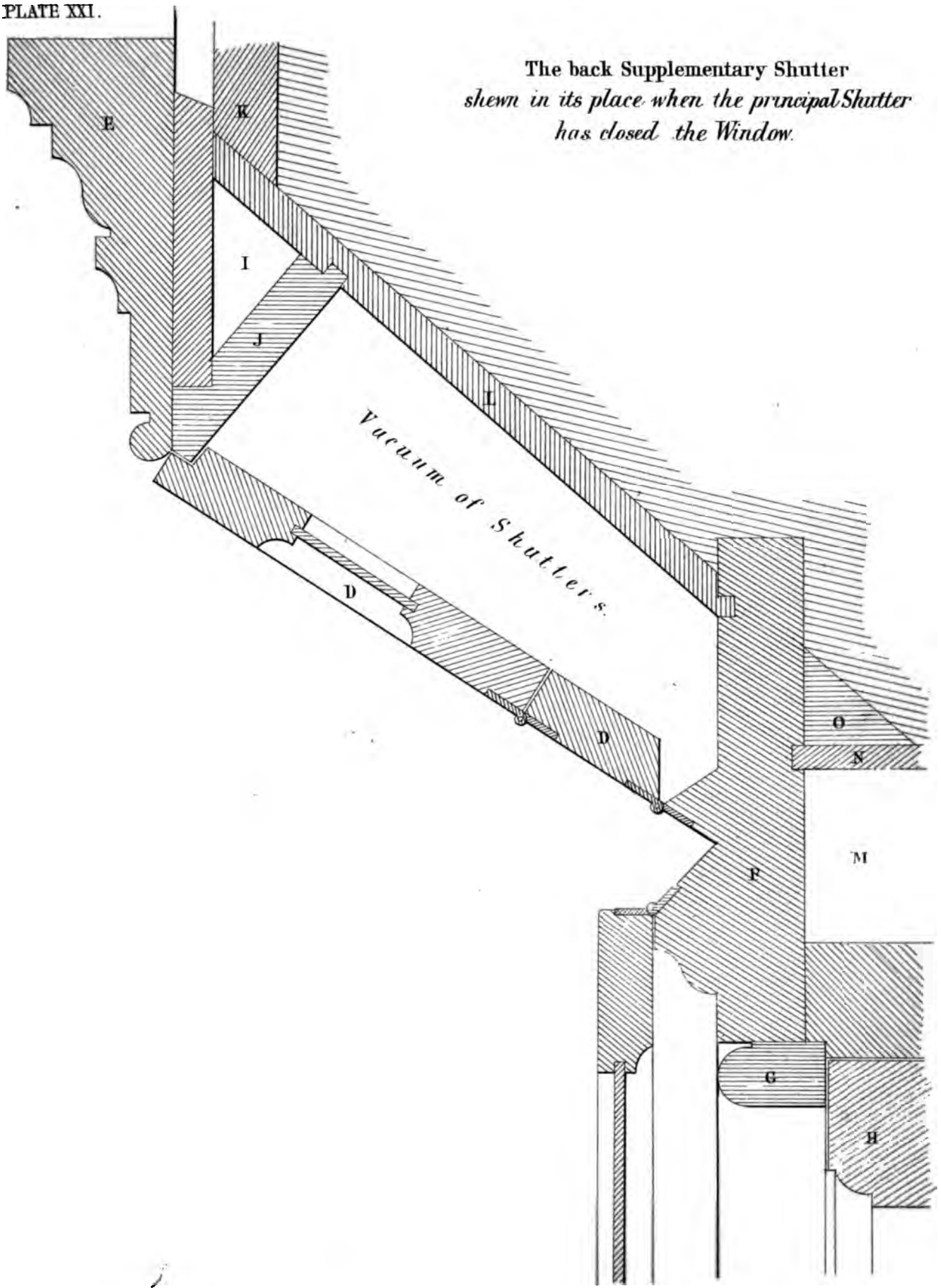
PLATE XXI.



The back Supplementary Shutter
shewn in its place when the principal Shutter has closed the Window.

C Chabot Lines Skinner St.

PLATE XXI.

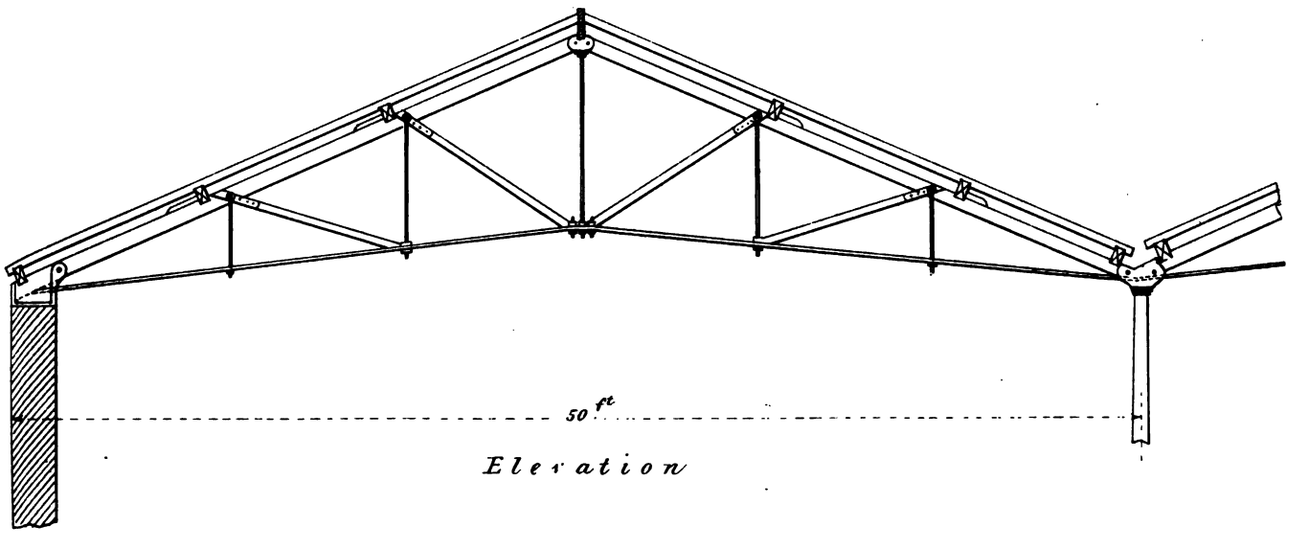


The back Supplementary Shutter
shewn in its place when the principal Shutter has closed the Window.

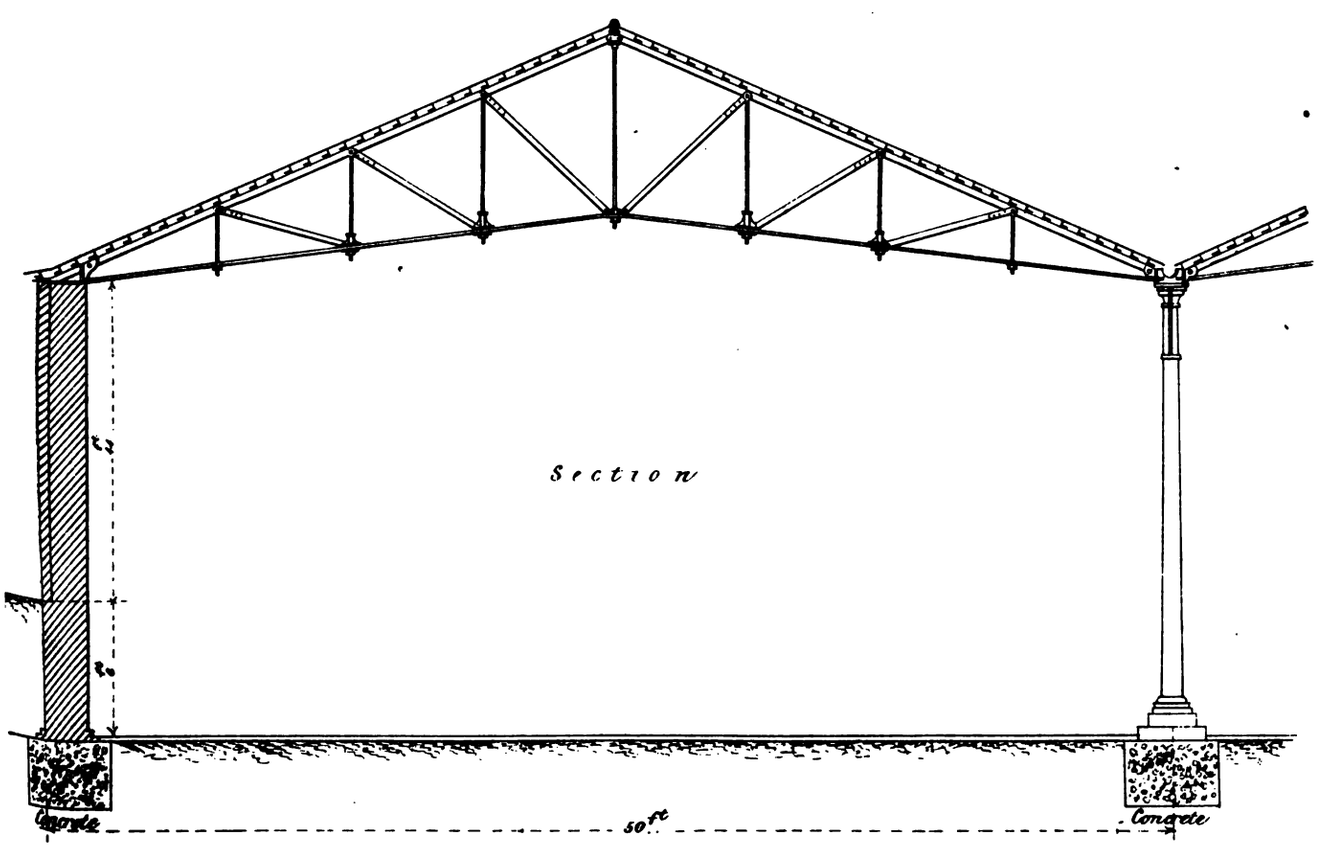
C Chabot Lines Skinner St.

PLATE XXIII.

Shed Roofs



Elevation

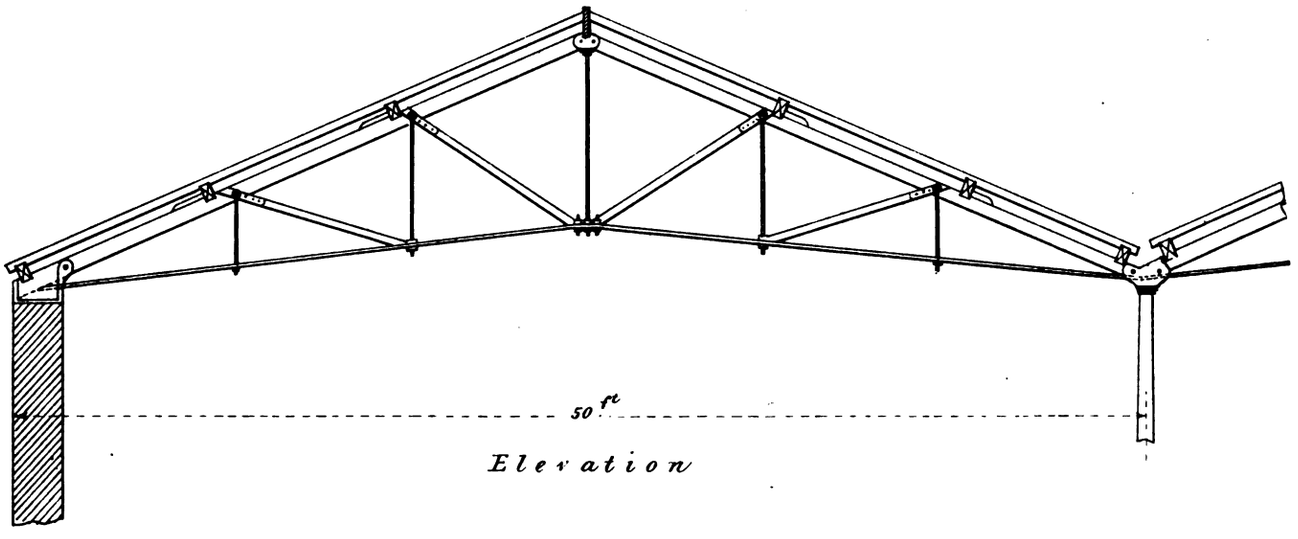


Section

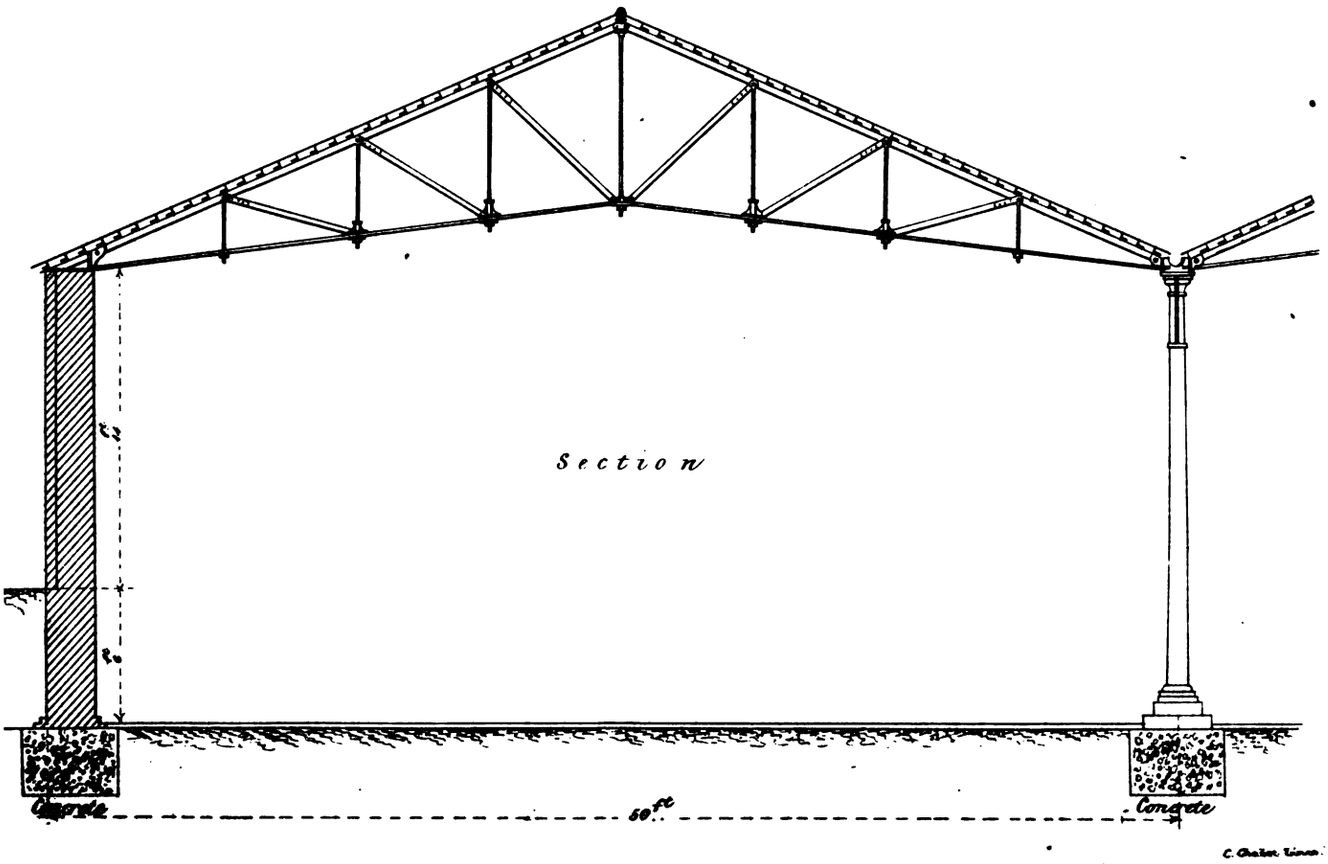
C Chabot Lincs

PLATE XXIII.

Shed Roofs



Elevation

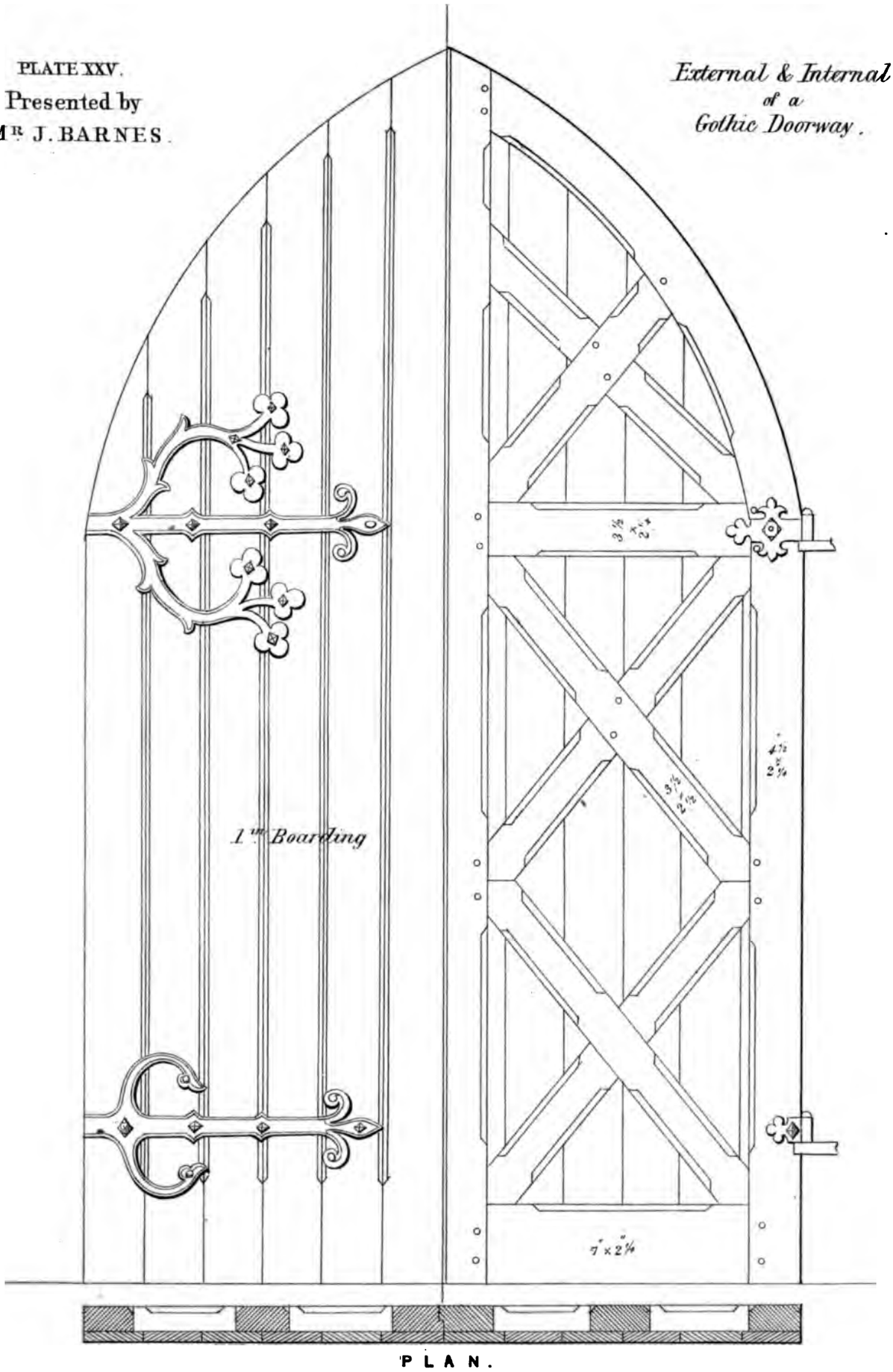


THE LIBRARY
OF THE
UNIVERSITY OF
ILLINOIS

PLATE XXV.

Presented by
Mr. J. BARNES.

External & Internal of a Gothic Doorway.

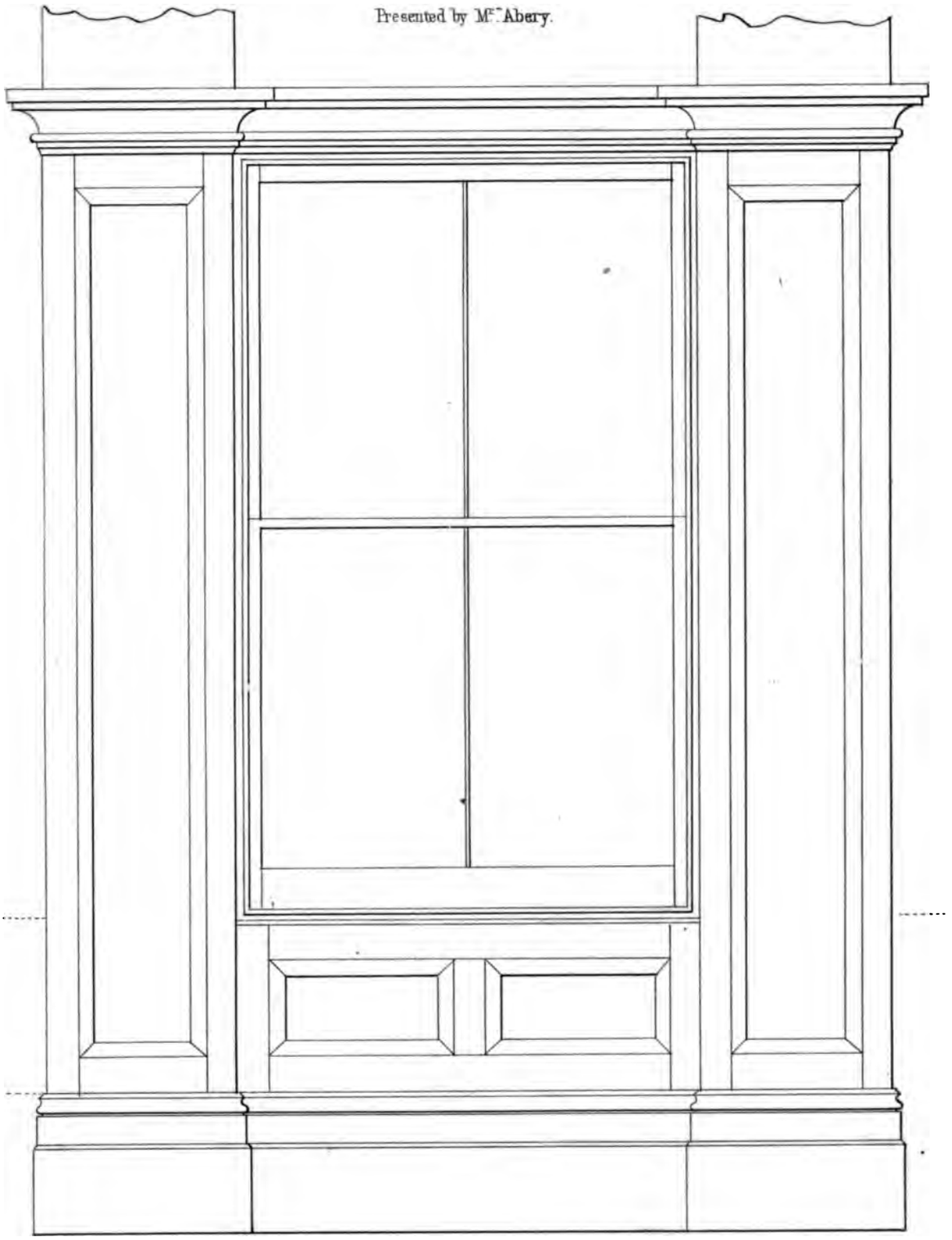


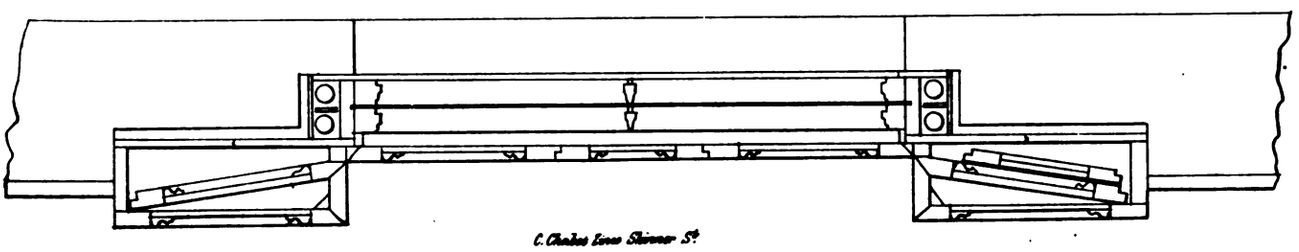
PLAN.

THE NEW
PUBLIC LIB
ASTOR, LE
TILDEN FOUN

PLATE XXVI.

Presented by Mr. Abery.





C. Chabot Lines Skinner St.

THE NEW YO
PUBLIC LIBRA
ASTOR, LENO
TILDEN FOUNDATI

PLATE XXVII.

Presented by Mr. Abery.

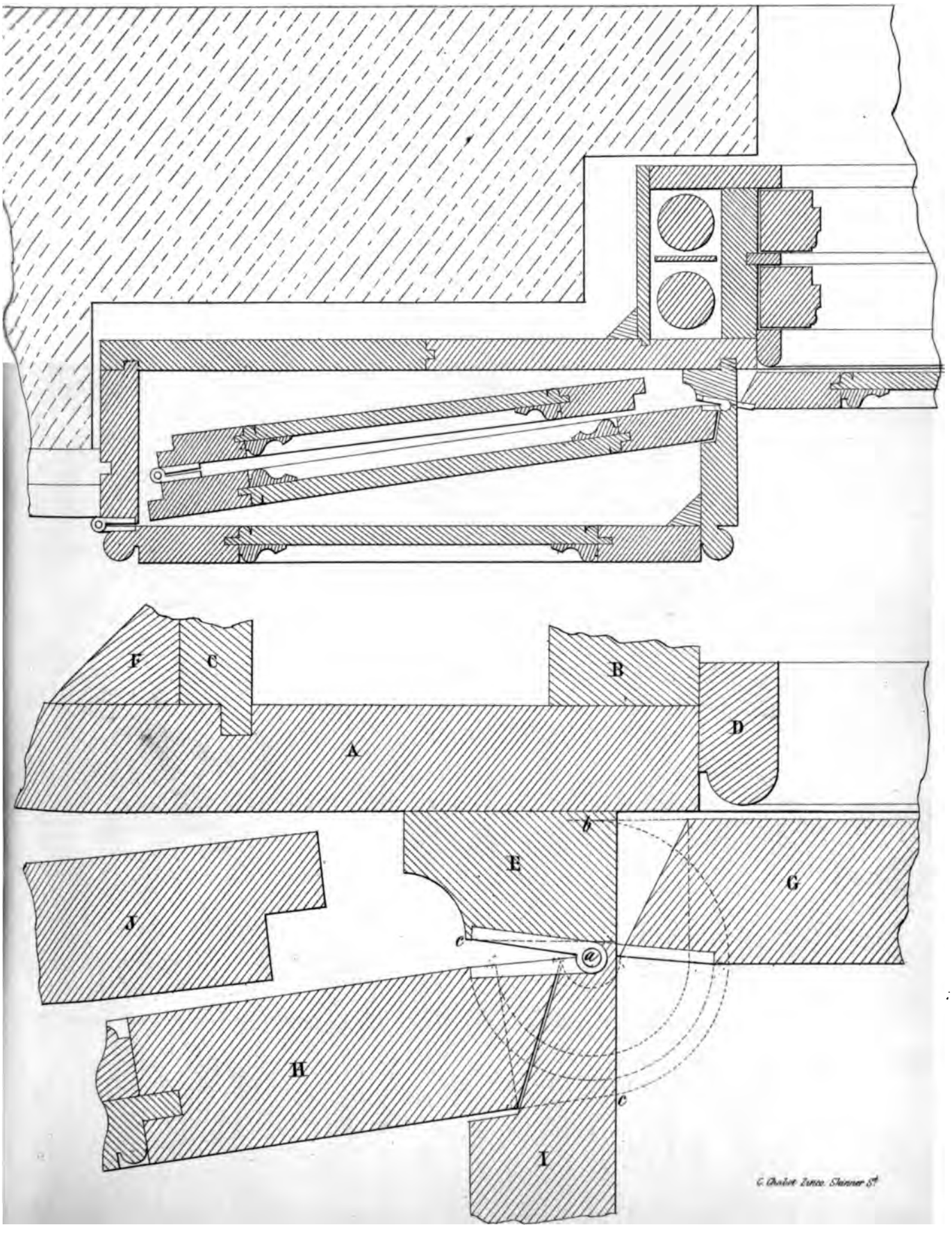
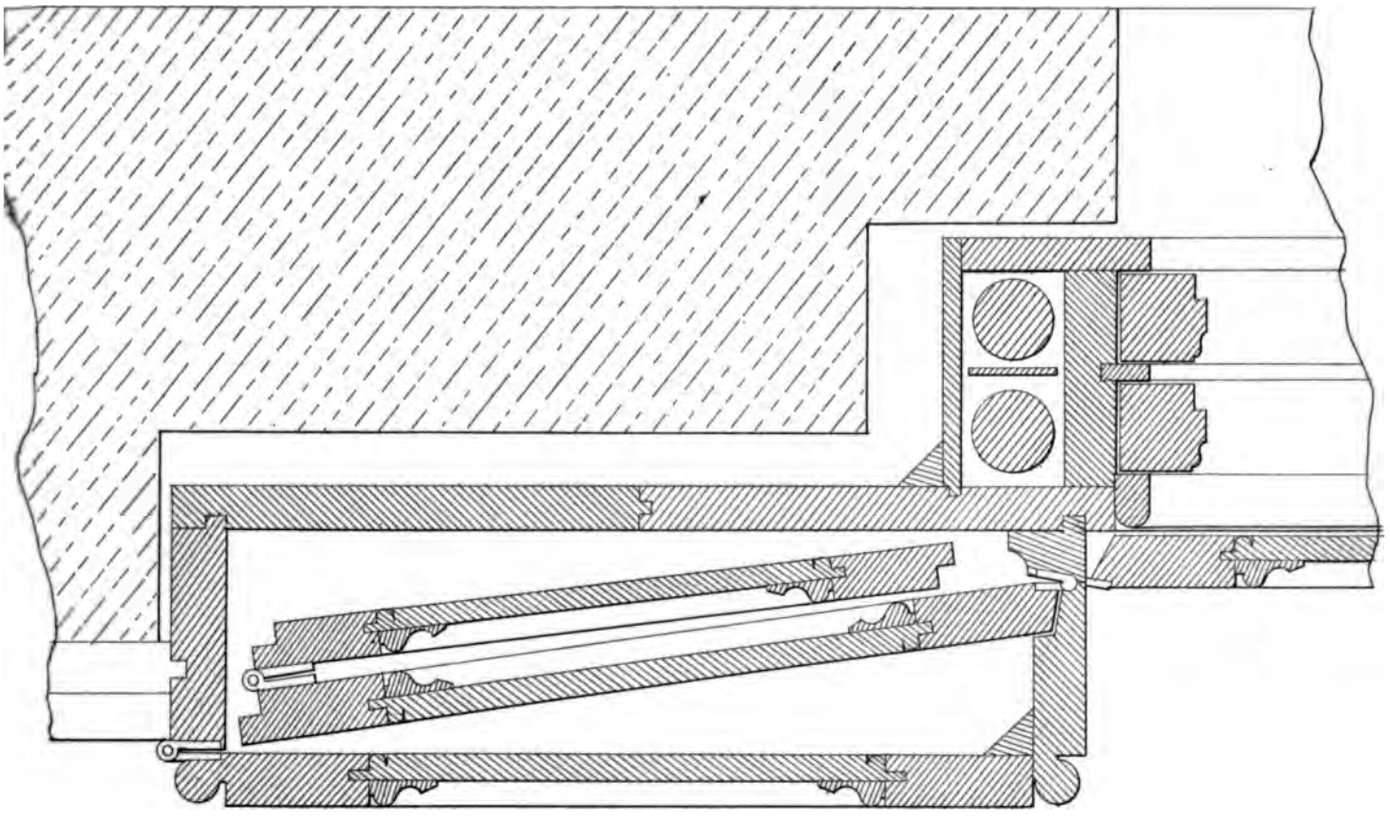


PLATE XXVII.

Presented by Mr. Abery.



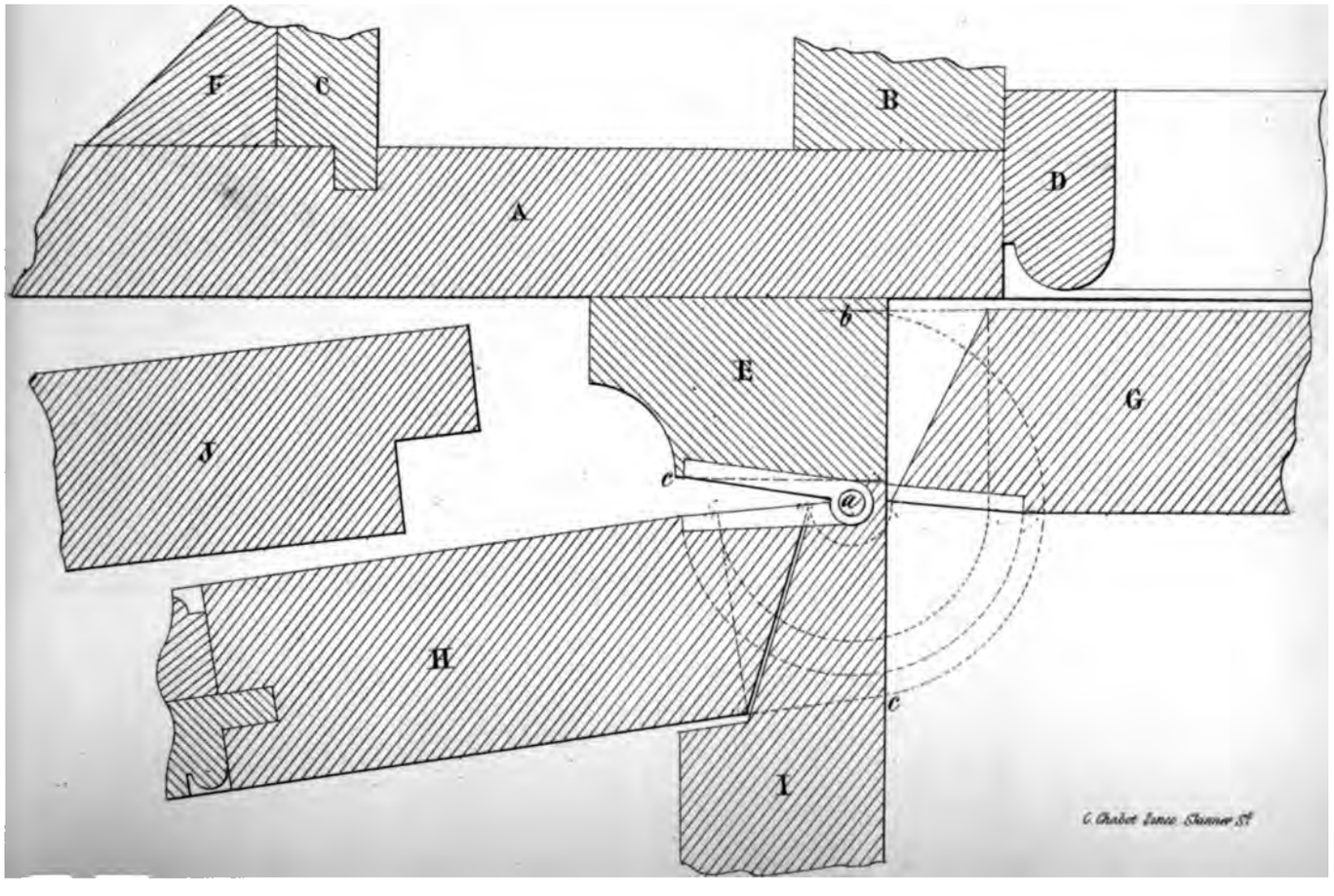
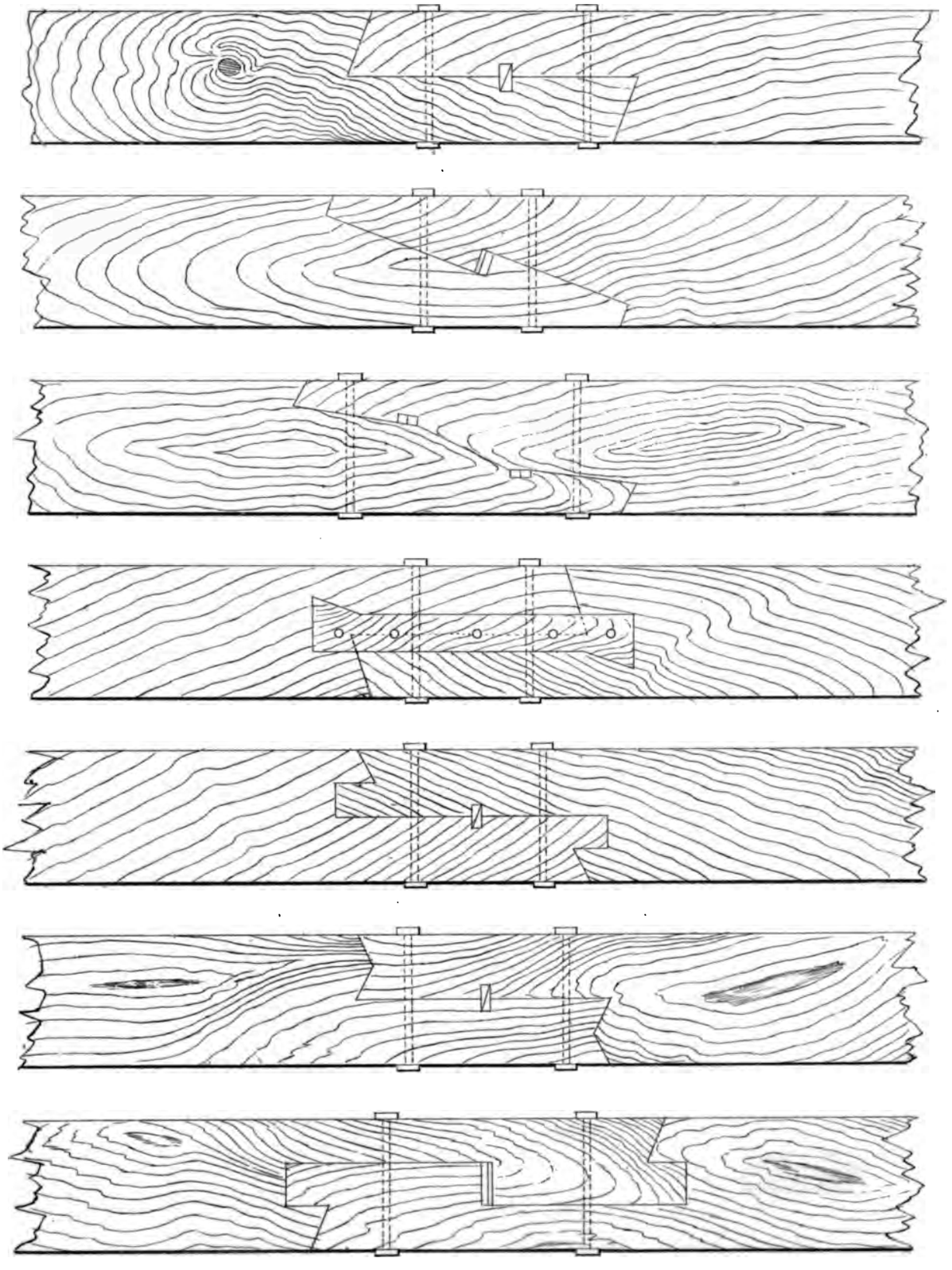


PLATE XXIX.

SCARFING OF TIMBERS.

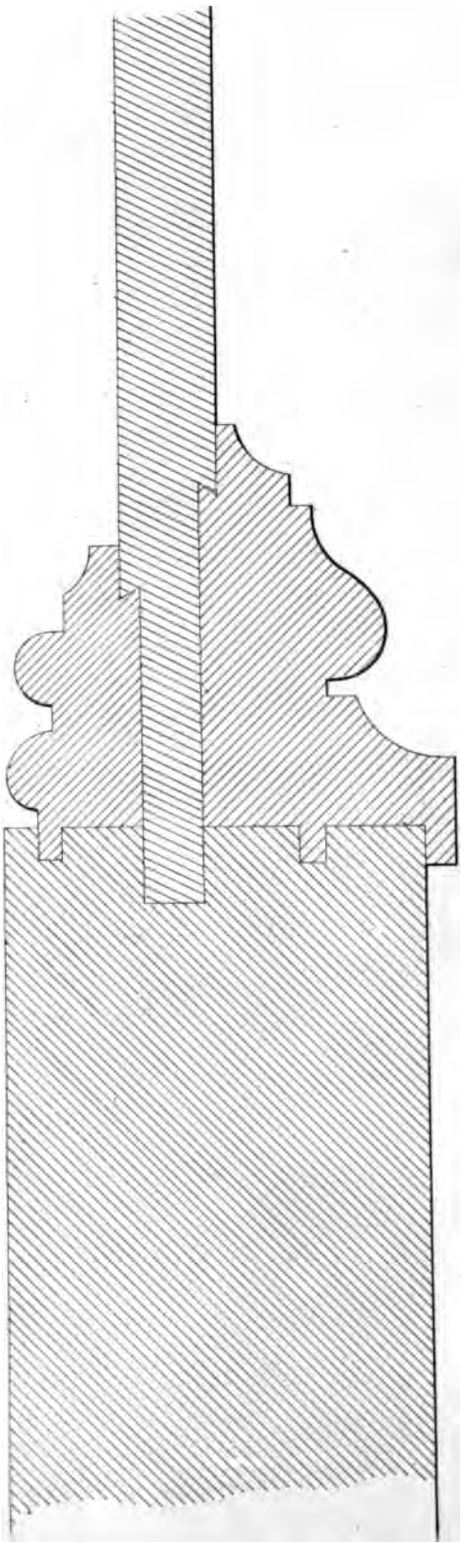
Presented by Mr. Haddock

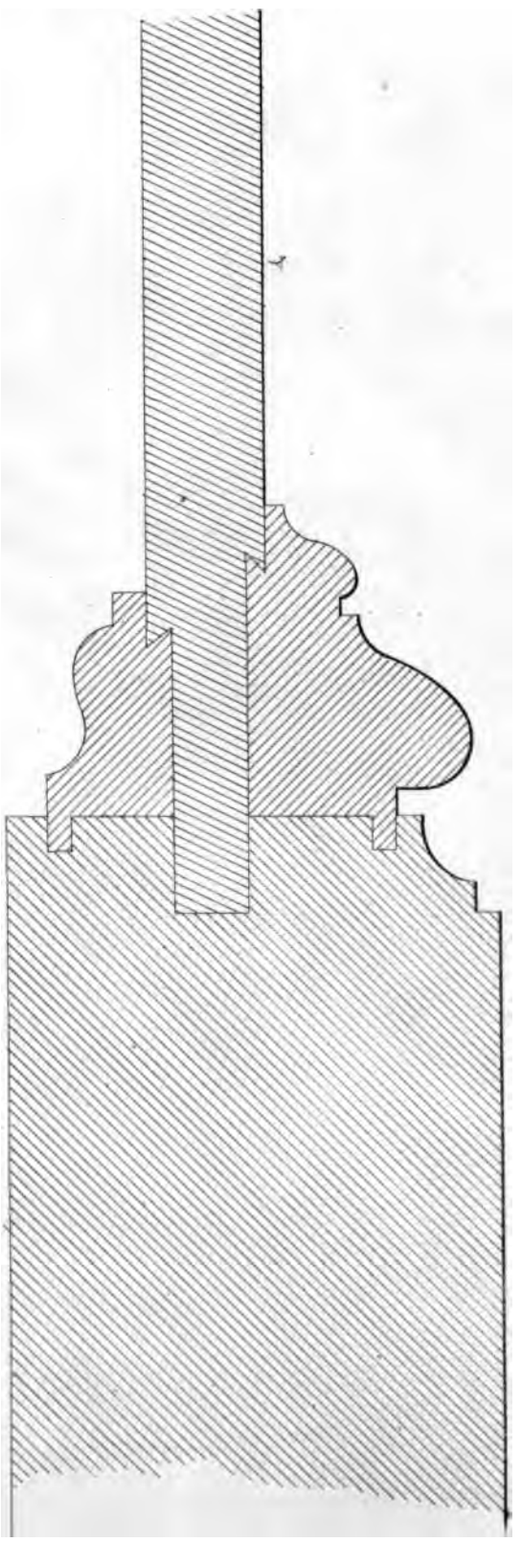


C. Chabot Lith. Sherrer St

ATE XXX.

Method of putting together Wainscoat Framing as executed at the New Houses of Parliament; applicable also to mahogony or any other wood where sprigging of mouldings would be unworkmanlike

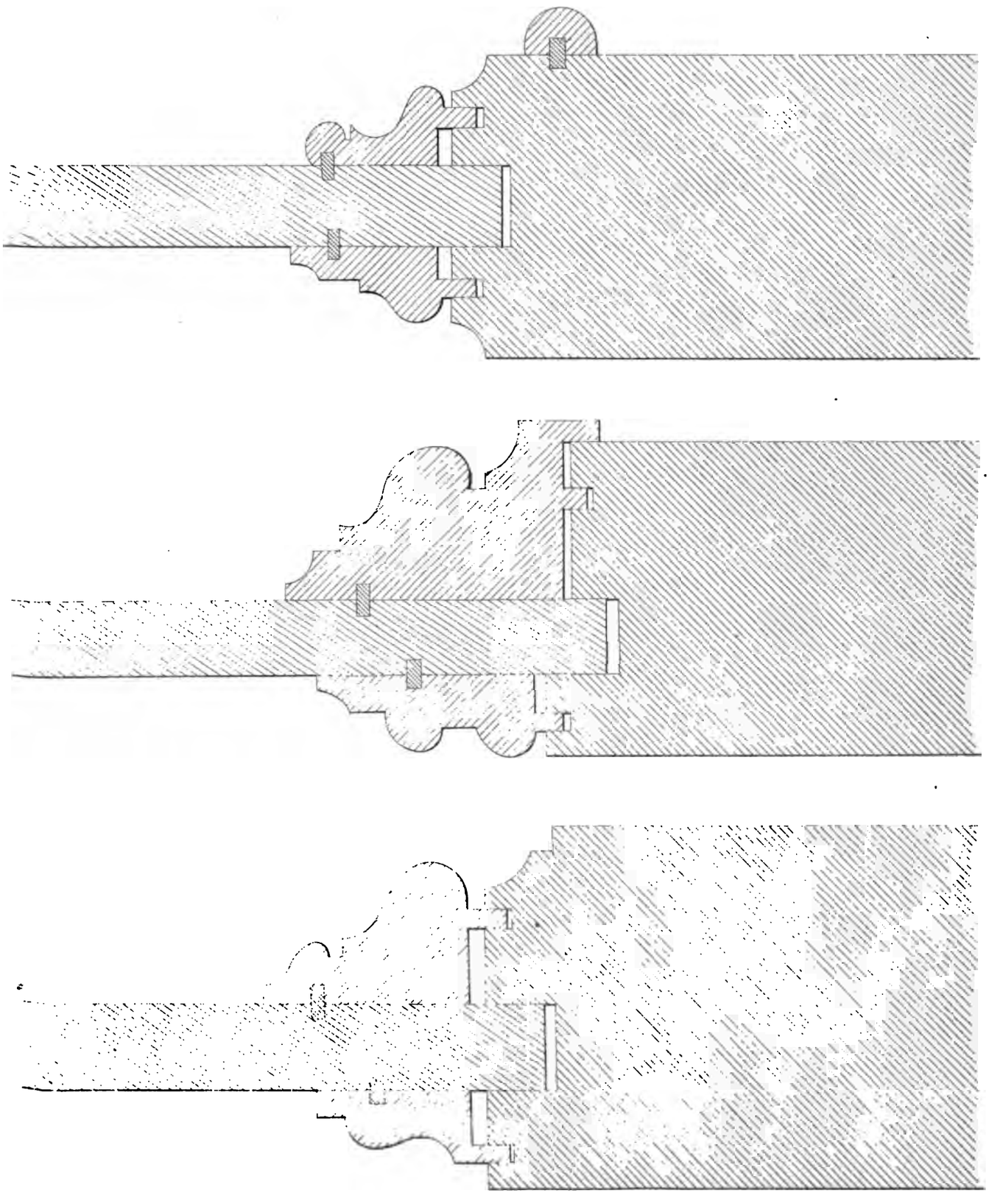




C Chabot Zinco Skinner St

PLATE XXXI.

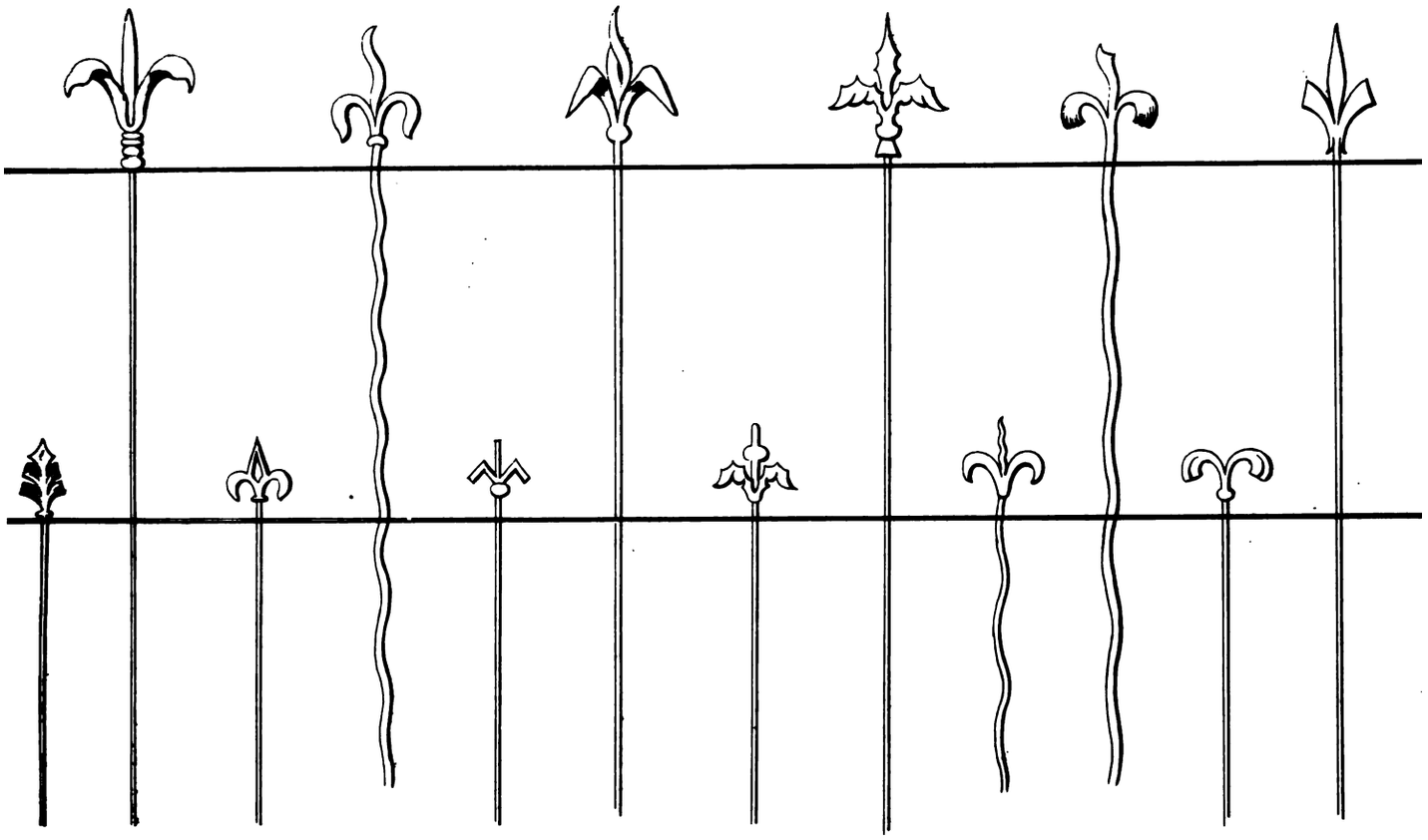
Another method of putting together Wainscoat Framing as executed at the New Houses of Parliament.

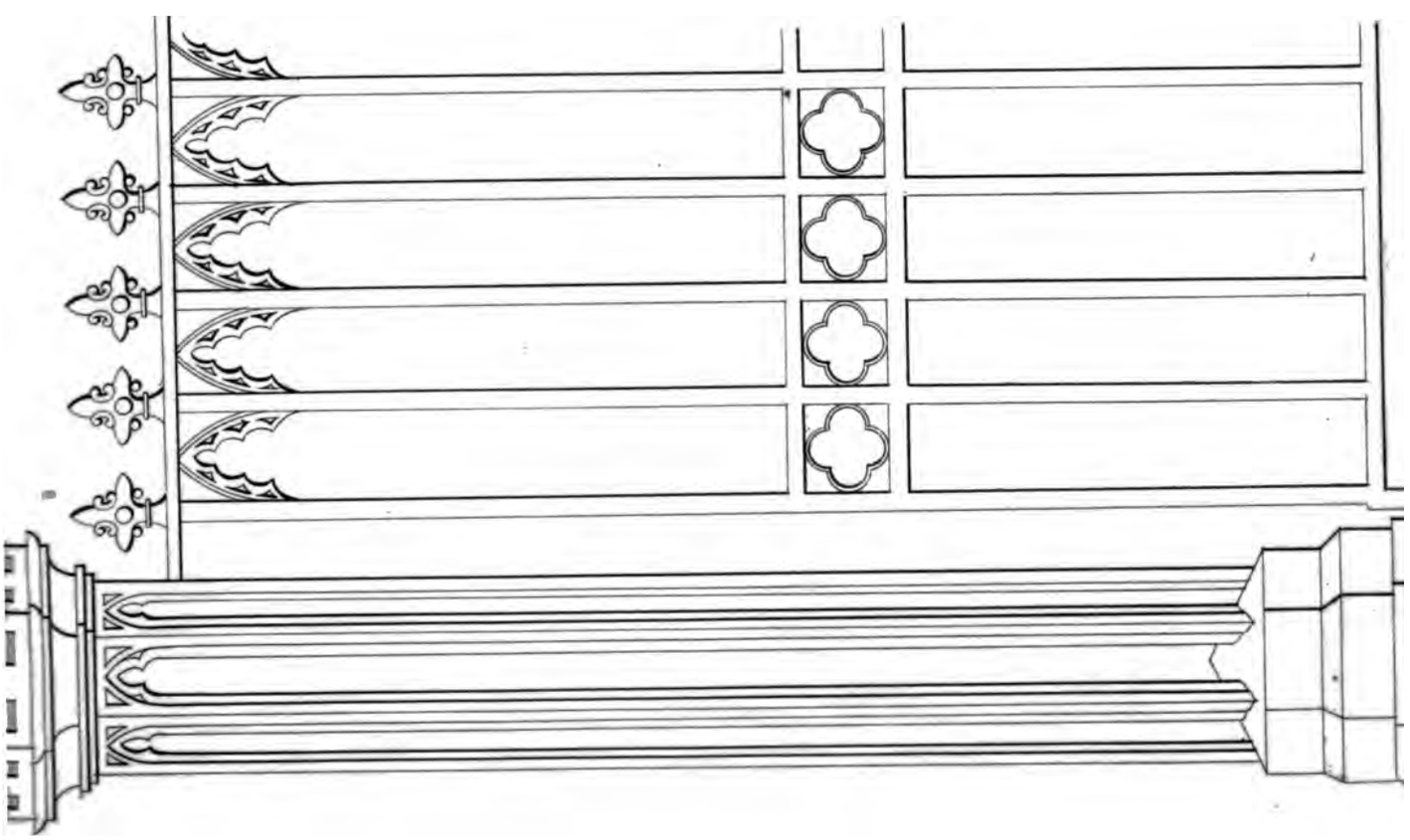


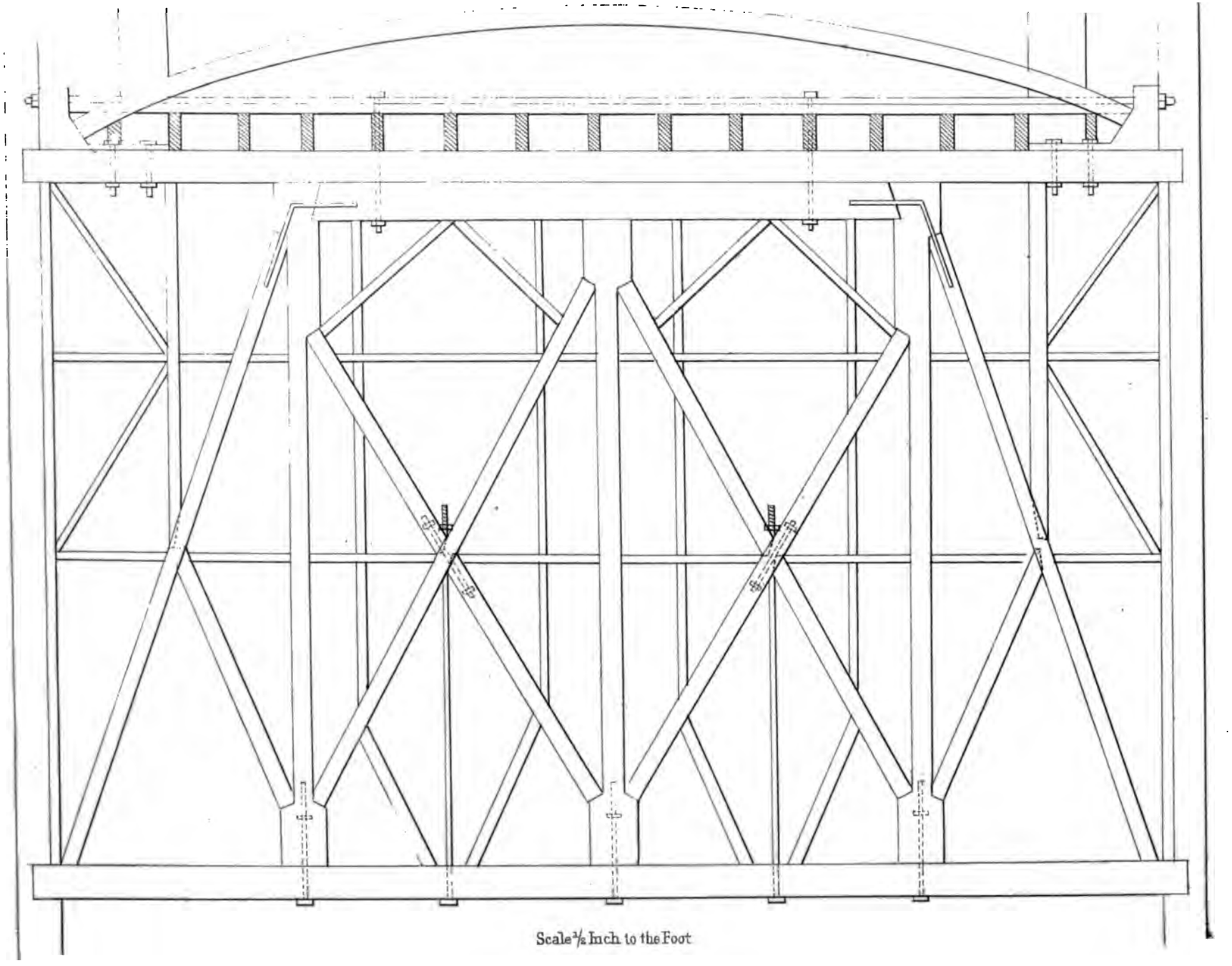
C. Chabot Lith. Skinner St.

PLATE XXXIV.

Various patterns of Wrought Iron Railing, Cast Iron Gate & Cast Iron Octangular Pilaster.







Scale 3/8 Inch to the Foot

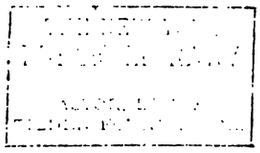
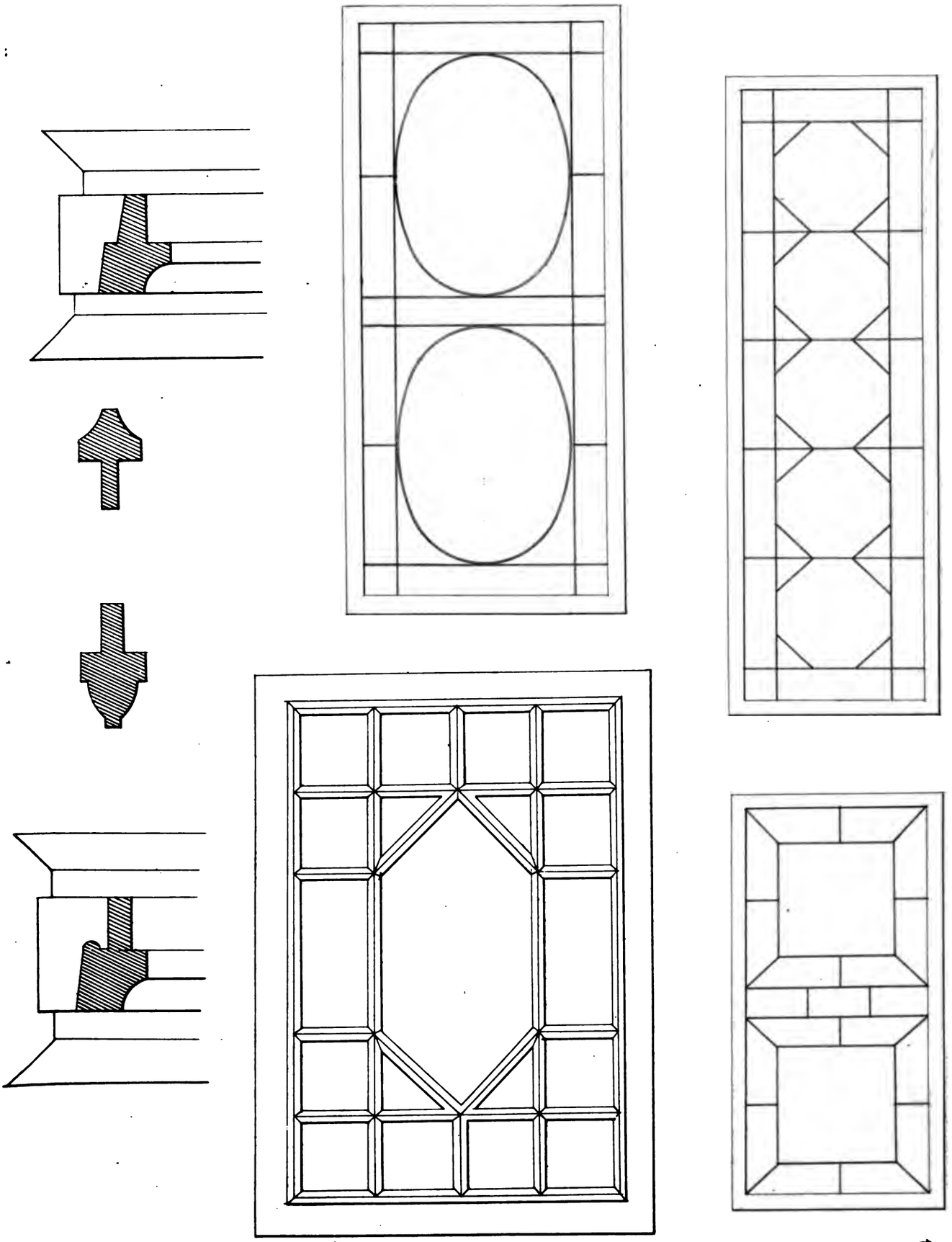


PLATE XXXVI.

Windows for ordinary Cottages, presented by Mr Haddock 2nd Foreman at the Shops of the Houses of Parliament.



C. Chabot Lince Skinner Sc.

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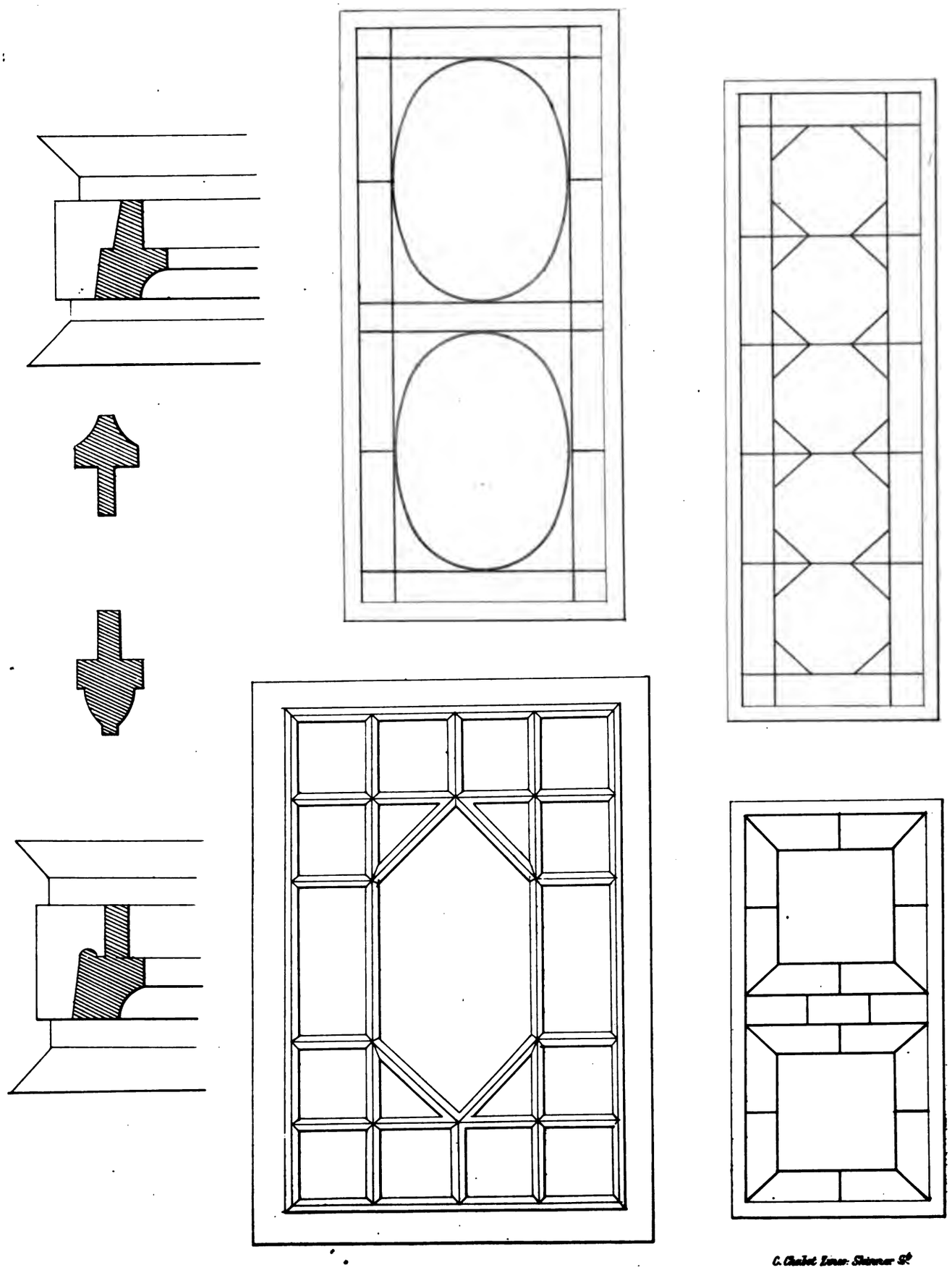
ATE XXXVI.

Windows for ordinary Cottages, presented by Mr Haddock 2nd Foreman at the Shops of the Houses of Parliament.



C. Chalet Lith: Skinner St.

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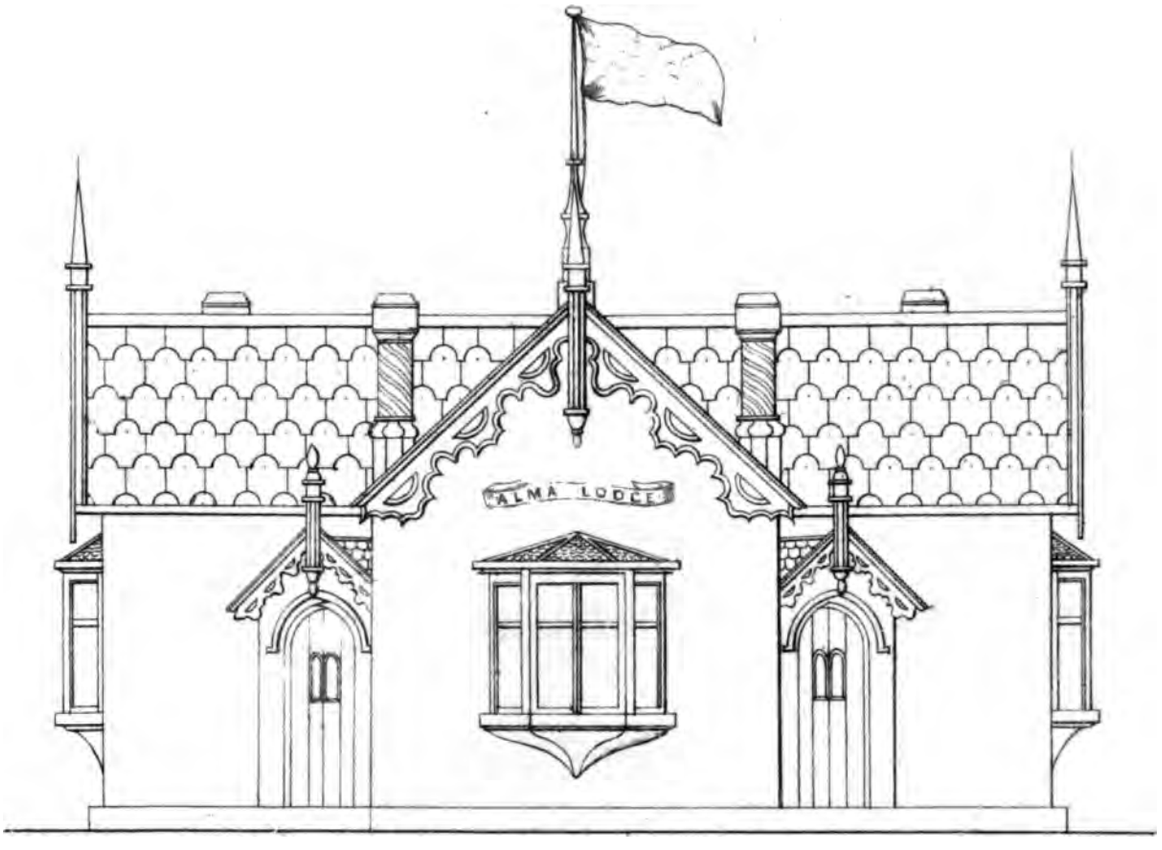
PLATE XXXVII.

Novel mode of constructing a Roof as now executing in St. Anne's Church Spitalfields

PLATE XXXIII.



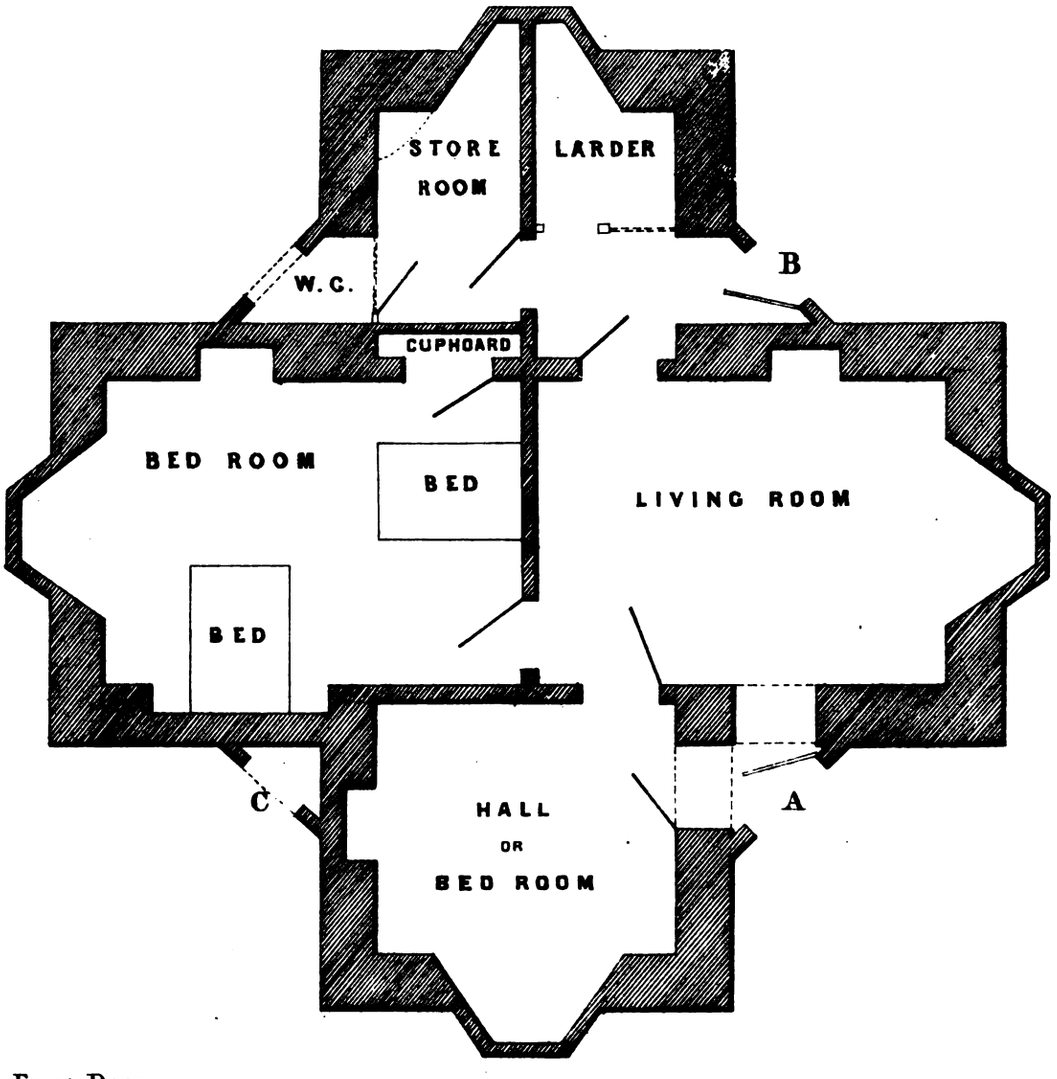
ELEVATION.

THE ALMA LODGE.

FRONTING EVERY WAY THE SAME.

Jos Galpin Archt.

PLATE XXXIV.



PLAN

A. Front Door.
B. Back Door.
C. Garden Tools.

THE ALMA LODGE.

FRONTING EVERY WAY THE SAME.

Jos. Galpin Archt.

PLATE XXXV.

THE BALACLAVA COTTAGE

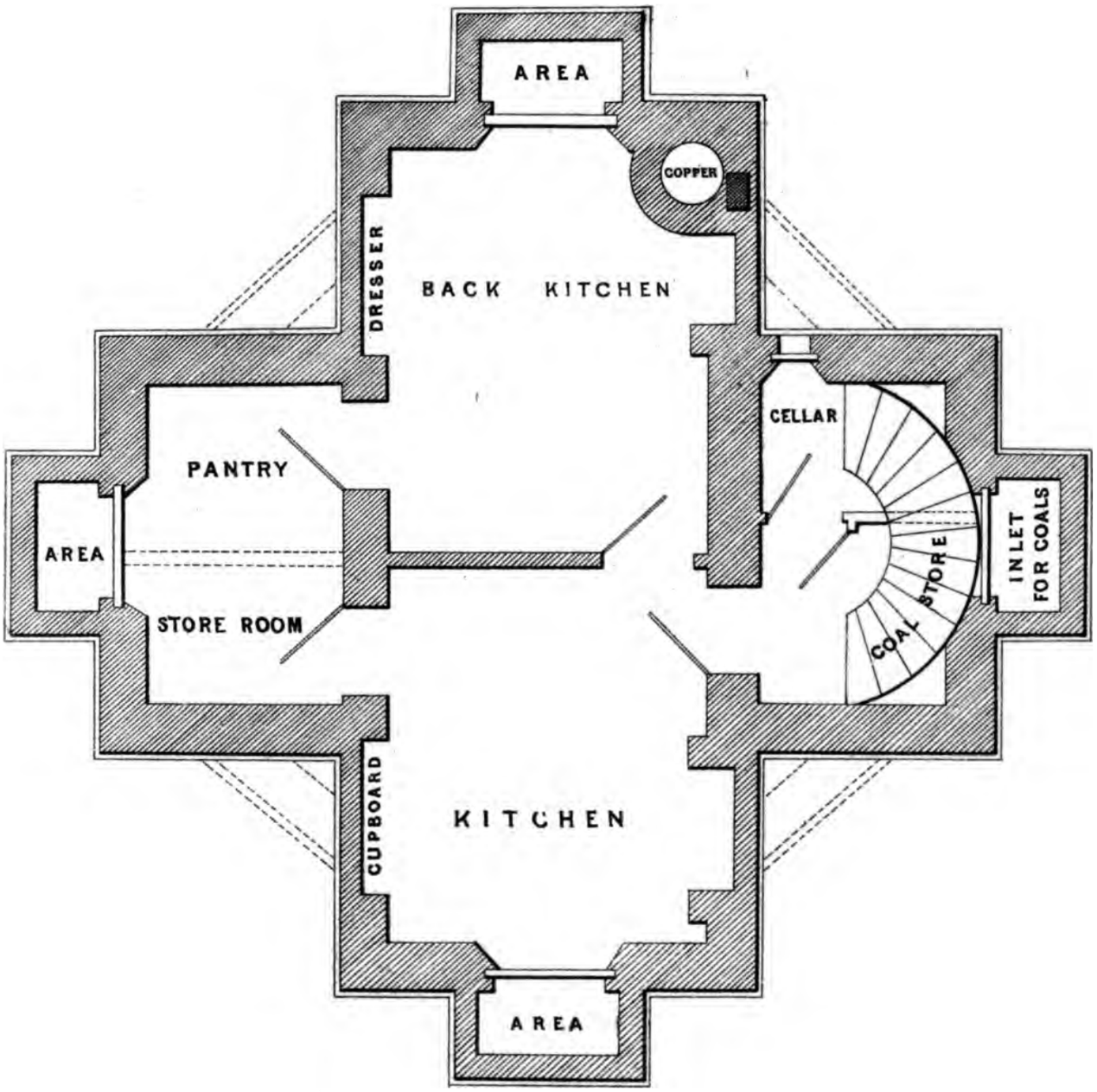
ELEVATION

Scale $\frac{3}{16}$ of an inch to a foot.

J. GALPIN
ARCHITECT

PLATE XXXVI.

THE BALACLAVA COTTAGE.



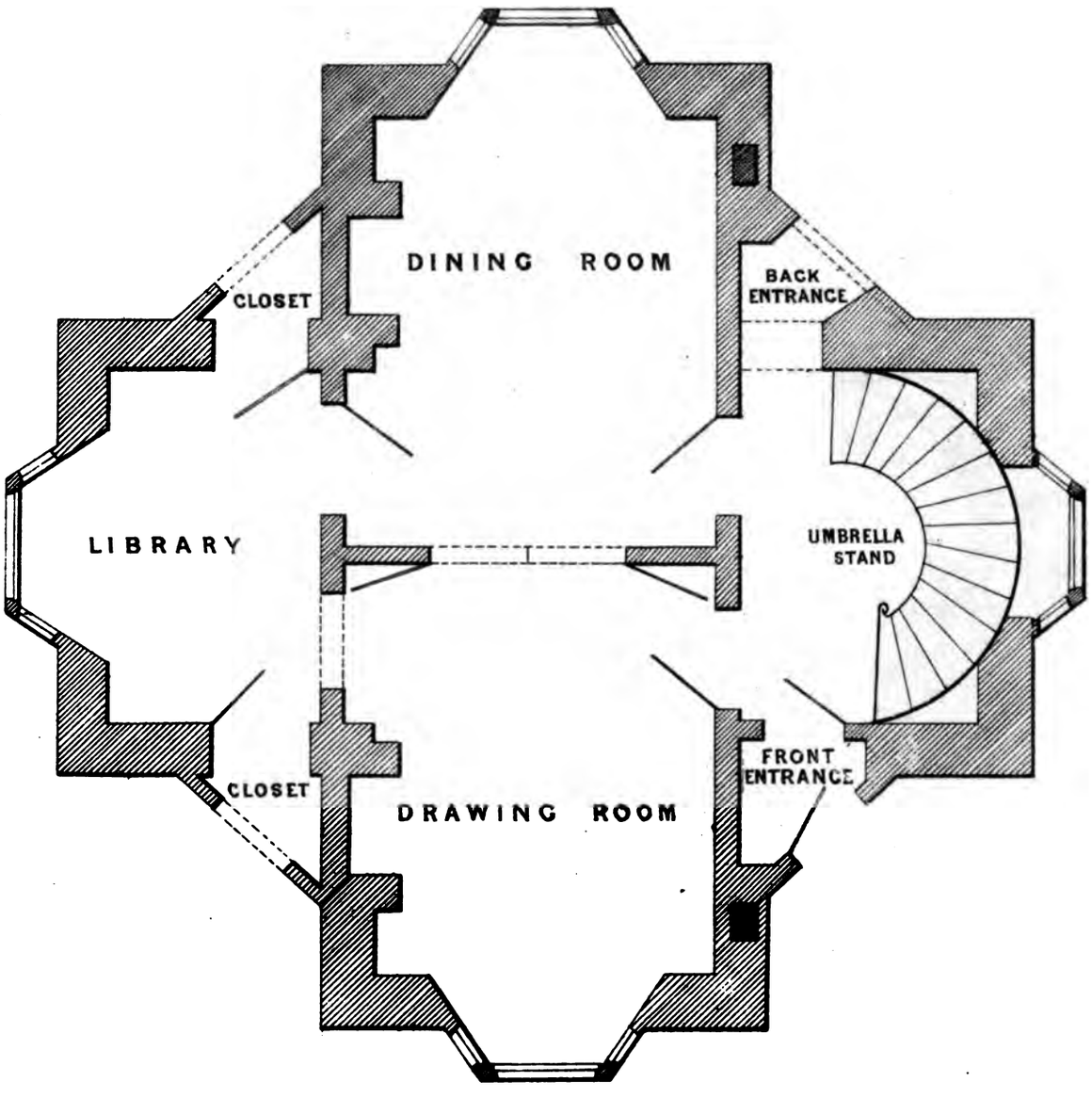
BASEMENT.

Scale $\frac{3}{8}$ of an inch to a foot.

J. GALPIN

PLATE XXXVII

THE BALACLAVA COTTAGE.



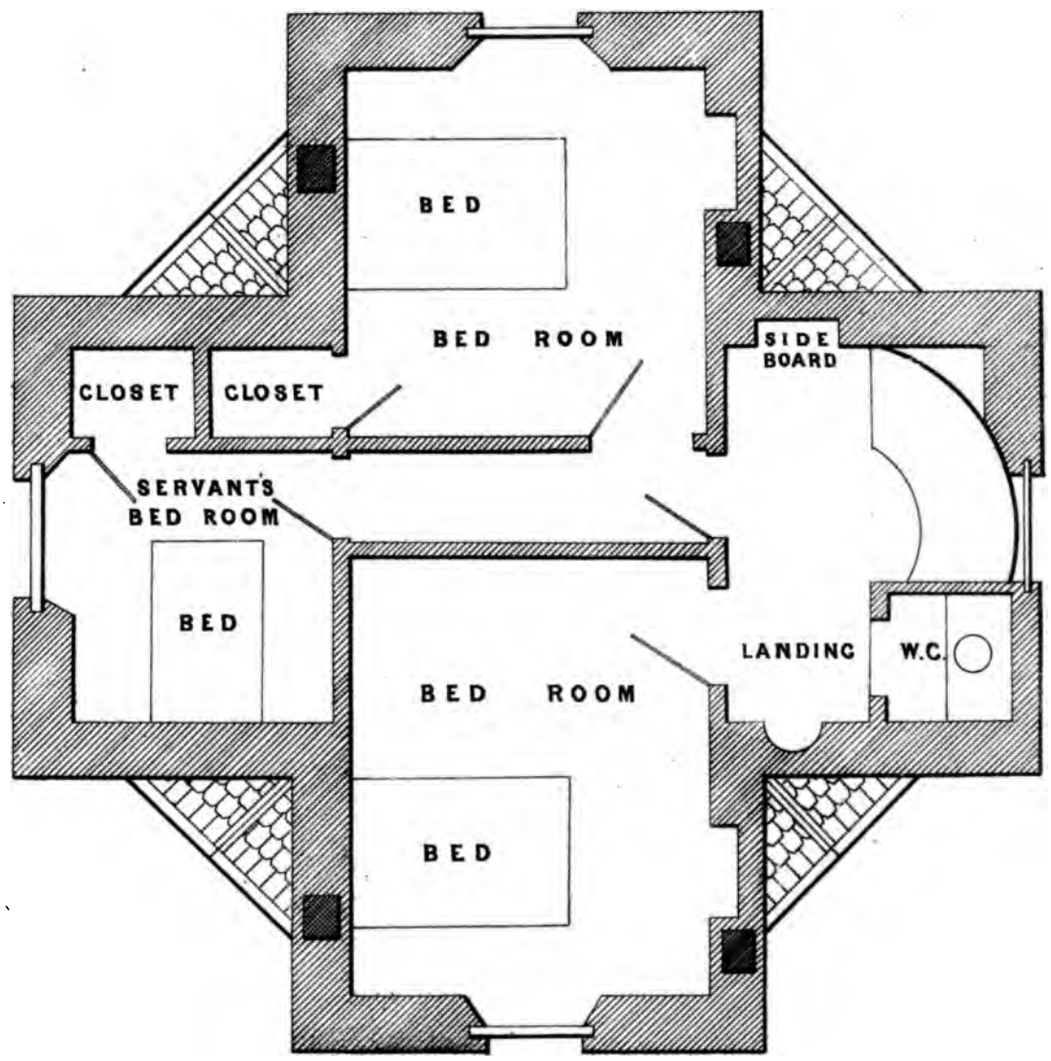
GROUND PLAN.

Scale $\frac{3}{16}$ of an inch to a foot.

J. CALPIN
ARCHITECT

PLATE XXXVIII.

THE BALACLAVA COTTAGE.



CHAMBER PLAN.

Scale $\frac{3}{8}$ of an inch to a foot.

J. CALPIN
ARCHITECT

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